THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED

THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER:

ELECTRO-PLATERS REVIEW.

OLD SERIES. Vol. 21. No. 9. | NEW YORK, SEPTEMBER, 1915. | NEW SERIES. Vol. 13. No. 9.

THE FOUNDRYMEN'S CONVENTION

A Few Facts Concerning the 1915 Meeting of Metal Men to Be Held at Atlantic City, N. J., September 25 to October 2.

Atlantic City, N. J., has been selected as the convention city for the foundrymen for 1915. As an endorsement of the wisdom of such a selection on the part of the joint committee of the three associations who will take part a few statements regarding the city itself seem to be in order.

Atlantic City is reached with great facility and in quick time over the tracks of two railroads, the Pennsylvania and the New Jersey Central. It is the largest resort along the Atlantic coast of the United States, and ranks in international renown with Brighton, Ostend, Scheveningen, Trouville, Biarritz, San Sebastian and the other popular watering places of Europe. Its boardwalk, sixty feet wide is eight miles in length; there are four great steel piers, crowded with multifarious features of interest to visitors; the inner side of the boardwalk presents an almost unbroken line of shops and stores, of theatres and amusement places; there are more than a thousand hotels and boarding houses; there are many thousands of bathers daily, and there are more thousands of spectators; there is yachting and boating and fishing and crabbing, and every other variety of summer enjoyment that heart could wish or human ingenuity devise.

So much for the things to do. Then let your mind compass, for a moment, things as they are, or in other words of the exquisite natural location of this greatest of seaside resorts. Everybody knows Atlantic City, knows that it is on the sea; but everybody does not know that it is actually in the sea. This resort is really upon an island ten miles in length and one mile in width, separated from the mainland by seven miles of bays and salt meadows, and extending nearly due east and west—a fair target for the prevailing southwest breeze. It is scarcely necessary to look further for the secret of Atlantic City's health-building and exhilarating climate.

ATLANTIC CITY, NEW JERSEY. THE WONDERFUL BATHING BEACH WHERE THE FOUNDRYMEN WILL FIND RELAXATION DURING THE WEEK OF SEPTEMBER 25 TO OCTOBER 2, 1915.

The associations taking part in the convention are the American Foundrymen's Association and the American Institute of Metals, whose headquarters will be the Hotel Traymore, where the sessions will be held. The Foundry and Machine Exhibition Company will hold their tenth annual exhibit of foundry and machine shop supplies and machinery at the same time on Young's Million Dollar

Steel Pier, a picture of which was published in THE METAL INDUSTRY for January, 1915.

The program as now prepared by Secretary W. M. Corse, of the American Institute of Metals, is as follows:

MONDAY, SEPTEMBER 27.

Registration.

MONDAY EVENING, SEPTEMBER 27.

Informal Dance, Young's Pier.

TUESDAY, SEPTEMBER 28, 10 A. M.

Opening session, joint meeting with the American Foundrymen's Association.

"Albany Sand," by D. H. Newland, Assistant State Geologist, New York.

"Molding Sands," by C. P. Karr, Associate Physicist, Bureau of Standards, Washington, D. C.

TUESDAY, SEPTEMBER 28, 2 P. M.

General Papers.

"Report of Official Chemist," by Arthur D. Little, Inc., Boston, Mass.

"An Investigation of Fusible Tin Boiler Plugs," by Dr. Burgess, Bureau of Standards, Washington, D. C.

"The Influence of the Impurities of Spelter on the Cracking of Slush Castings," by Gilbert Rigg, New Jersey Zinc Company, New York.

"Cobalt in Non-Ferrous Metals," by H. T. Kalmus, Kalmus, Comstock & Westcott.

"Furnace Methods for Pure Castings," by F. L. Antisell, Raritan Copper Works, Raritan, N. J.

"Standard Test Specimen of Zinc-Bronze; Cu .88, Sn .10, Zn .2. Relation of the Mechanical Properties to the Microstructure," by Dr. Rawdon, Bureau of Standards, Washington, D. C.

"Notes on the Copper-Rich Kalchoids," by S. L. Hoyt, University of Minnesota.

TUESDAY, SEPTEMBER 28, 8 P. M.

Theatre party for members of the American Foundrymen's Association and the American Institute of Metals.

WEDNESDAY, SEPTEMBER 29, 10 A. M.

"The Effect of the Present European War on the Metal Industries," by Thos. F. Wettstein, United Lead Company, New York.

"Sherardizing," by Dr. S. Trood, U. S. Sherardizing Company, New Castle, Pa.

"Electric Furnaces for Brass Melting," by F. A. Fitzgerald, Fitzgerald Laboratories.

"Substitutes and Alloys to Take the Place of Platinum," by W. E. Mowrey, St. Paul, Minn.

"Alloys of Nickel, Chromium and Copper," by David F. McFarland and O. E. Marder, University of Illinois.

WEDNESDAY, SEPTEMBER 29, 2 P. M.

Aluminum and Aluminum Alloys.

"Aluminum Die Castings," by Chas. Pack, Dochler Die Casting Company, Brooklyn, N. Y.

"The Manufacture and Use of Alumino Vanadium," by Wm. H. Clark, Seymour Mfg. Company, Seymour, Conn.

"Recent Advances in the Manufacture and Uses of Aluminum," by E. V. Pannell, British Aluminum Company, Toronto, Canada.

"The Welding of Aluminum," by E. V. Pannell, British Aluminum Company, Toronto, Ont.

"Aluminum Bronze Alloys," by W. M. Corse, The Titanium Alloy Mfg. Company, Niagara Falls, N. Y.

THE HOTEL TRAYMORE, ATLANTIC CITY, N. J., THE HEADQUARTERS OF THE ALLIED FOUNDRYMENS' ASSOCIATIONS DURING THE CONVENTION, SEPTEMBER 27-OCTOBER 1, 1915.

THURSDAY, SEPTEMBER 30, 10 A. M.

Acid Metals and Bearing Bronzes.

"Development of an Acid Resisting Alloy," by S. W. Parr, University of Illinois.

"Method of Analysis for Complex Alloys," by S. W. Parr, University of Illinois.

"Effect of Zinc on Copper, Tin, Lead Alloys," by G. H. Clamer, The Ajax Metal Company, Philadelphia, Pa.

"The Advantages of a Standard Railway Journal," by Russell R. Clarke, Pennsylvania Lines West, Pittsburgh, Pa.

THURSDAY, SEPTEMBER 30, 2 P. M.

Forging and Rolling Alloys.

"Forging Manganese Bronze," by Jesse L. Jones, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

"The Failure of Structural Bronzes," by Dr. Merica, Bureau of Standards, Washington, D. C.

"Experiences with Brass in Civil Engineering Work," by A. D. Flinn, Board of Water Supply, New York.

"Stellite," by Elwood Haynes, Haynes Stellite Works, Kokomo, Md.

THE ANNEALING OF BRASS CARTRIDGE CASES

A Brief Description of the Manner in Which These Articles Are Now Being Manufactured.

By L. J. Krom.

The brass cartridge case now being made in such large numbers in this country requires careful treatment throughout all stages of its manufacture and no one operation is any more important than the heat treatment. The manufacture of the brass which enters into the case or shell is, of course, a very important and particular procedure. The best of materials, i. e., copper and spelter must be used and all the skill of the melter and caster must be brought into play if the resultant brass is to stand the subsequent operations. The description of the manufacture of the brass blanks or discs from which the cartridge case is drawn up would require a separate story in itself and as this article is concerned mainly with the heat treatment or annealing of the shells during the various stages of their development I will confine myself to a recital of the methods pursued in several factories turning out thousands of these shells per day. Cartridge brass usually contains 70 parts of copper to 30 of zinc although there is a mixture being used for the British Government containing 72 parts of copper and 28 of zinc. The blanks for English 18-pound shells are 6¼ inches in diameter and 11/32 of an inch in thickness. The practice followed at one large plant in making these shells is as follows:

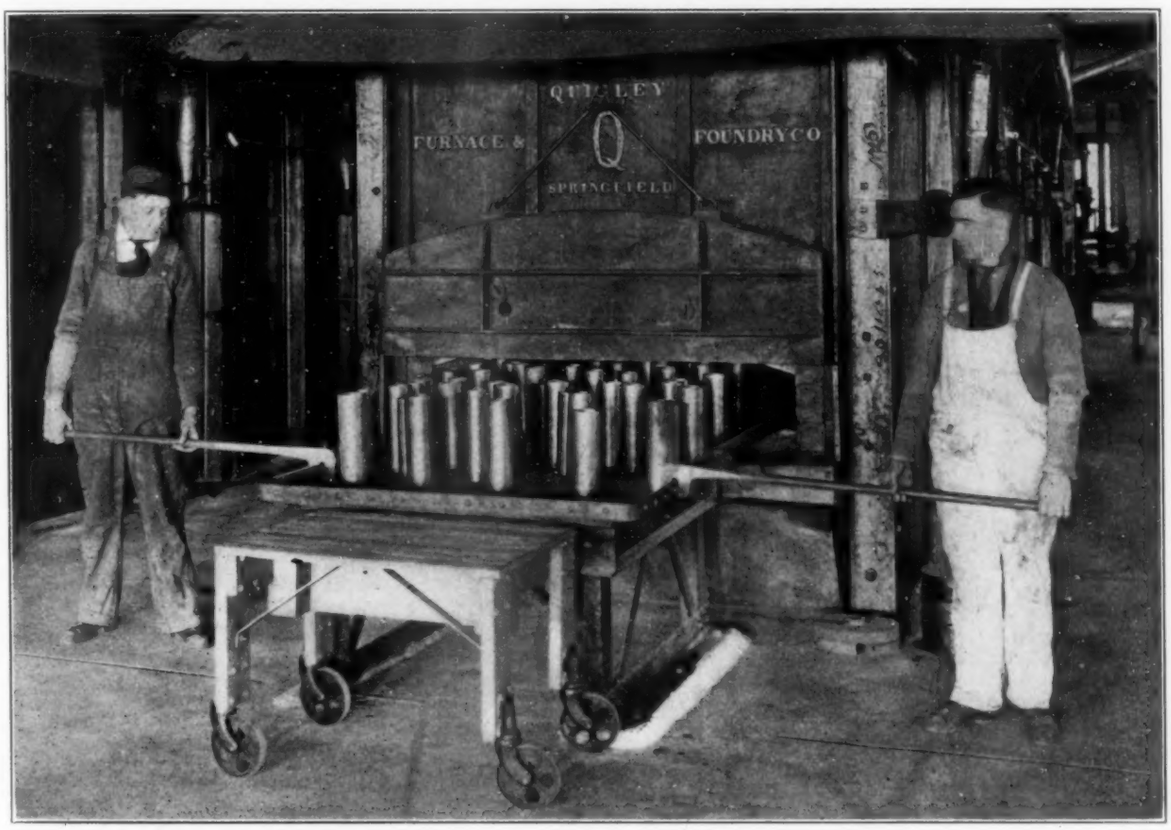


FIG. 1. OIL FIRED ANNEALING MUFFLE AT THE PLANT OF METALS DRAWING COMPANY, ST. CATHARINES, ONT., CANADA. INSTALLED BY QUIGLEY FURNACE AND FOUNDRY COMPANY, NEW YORK.

DRAWING AND ANNEALING.

They are turning out 3,600 eighteen pounder English casings per twenty-four hours. They have arranged five bulldozers and two heavy locomotive frame planers and two hydraulic presses, to handle the work of cupping and drawing. The operations beginning with the blank discs which are purchased from a brass rolling mill, are as follows: viz. The blanks are first cupped in a horizontal bulldozer to a diameter of 4 7/16 inches with 1⅝ inches high straight sides and a ¾-inch crown. The die and plunger on all the bulldozers are lubricated with an emulsion of oil and water known as the "New Era Lubricating Compound. After each cupping and drawing process, which will be described later, the casing is first washed in hot water; second, annealed at a temperature of about 1,200 degrees F. for thirty-eight to forty-two minutes; third, pickled in a hot solution of five gallons of sulphuric acid to 176 gallons of soft water. The heating is accomplished with lead steam pipes on the two longitudinal sides of the wooden tanks in which the pickling is done. All pickling and washing tanks are made of wood of ¾-inch tongue and groove white pine boards without lining and are bolted together; filling and drain connections are also of lead. The second drawing operation is also accomplished in a bulldozer and increases the straight side length of the casting to 3⅛ inches. Immediately after the second drawing and without previous annealing, the indenting operation is done. This provides the boss in the base of the shell for reception of the primer plug. The shell is then washed, annealed, pickled and rinsed and subjected to the third drawing operation. Following this in succession are the fourth and fifth drawing operations with their respective annealing operations. After the fifth drawing the shell is laid on a small cold saw table with a gauge

board indicating its length and the small cold saw 6 inches in diameter and 3/32-inch thick driven by a belt from a one-half horsepower motor cuts the case to length. The case is again annealed and subjected to the sixth and final drawing and is again trimmed to length after which it is washed, annealed, pickled and rinsed.

which is inserted in an oil-fire furnace in gangs of five on each side of each furnace; this practically consists of a horizontal muffle and is called a "Glory hole." A dull red temperature is maintained and the case is turned over twice while it lies in the pipe. It is subjected to this temperature for about forty seconds, after which it is

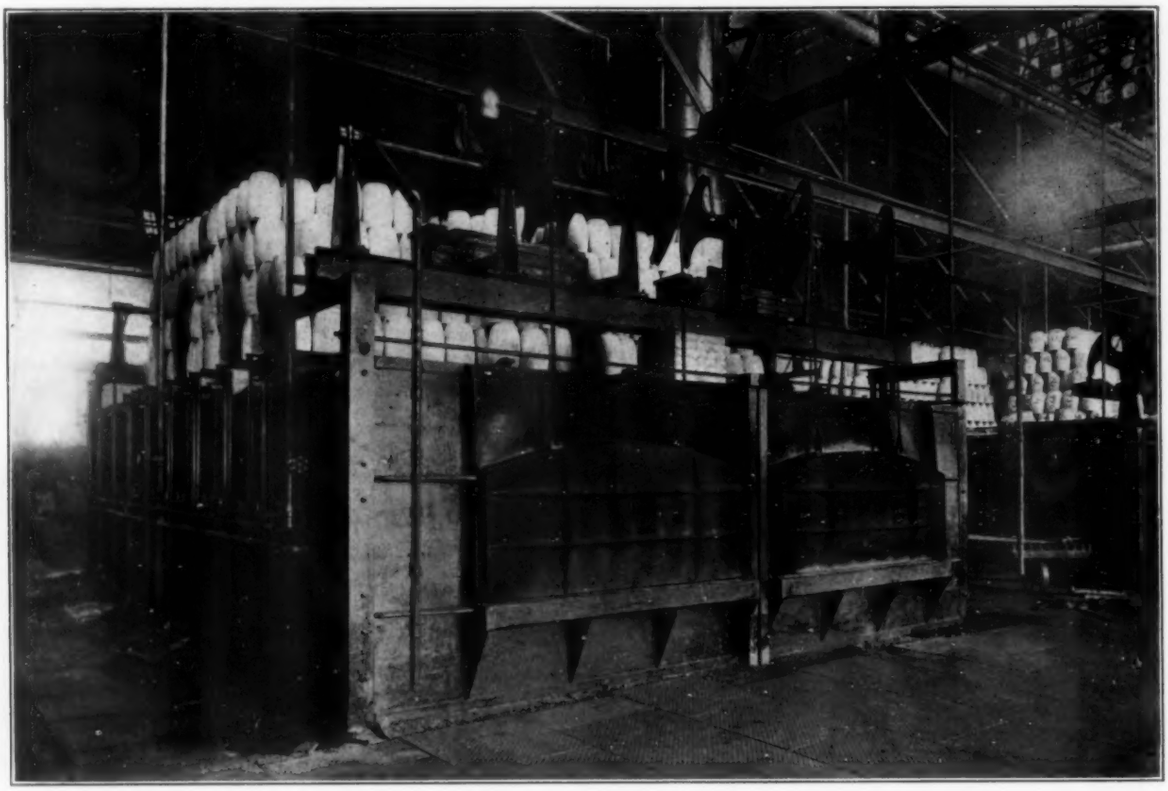
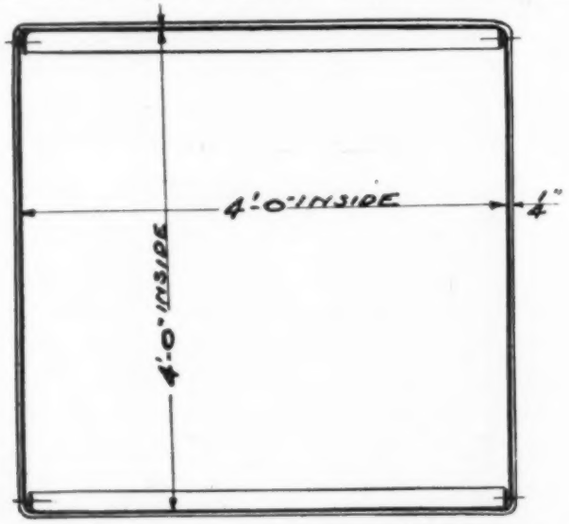


FIG. 2. A PAIR OF OIL FIRED ANNEALING MUFFLES AT THE PLANT OF THE MICHIGAN COPPER AND BRASS COMPANY, DETROIT, MICH. NOTE THE METHOD OF STORING CRUCIBLES.

HEADING.

The heading is accomplished on a 400-ton hydraulic press in two operations, after which without another



withdrawn with tongs and set mouth-up on an iron plate. Following the flash anneal, comes the two tapering operations; these consist of driving the case into a tapered die into which is inserted a parallel sided plunger. This plunger maintains a parallel side on the mouth of the case for a length of 1 inch from the mouth. The first tapering operation reduces the diameter at the mouth about two-thirds of the total, and the second operation completes the tapering. No further anneals are made and the shell is then machined in Bullard turret lathes which machine the face and diameter of the head, bore, ream tap, counter-bore and face the inside of the primer plug hole. An additional tool on the back of the turret lathe bores the inside of the mouth to a proper diameter and cuts the case off to length. The cases are finished by hand as follows, viz.:

They are dropped into taper bored cast iron vises mounted on a bench and the primer plug holes are tapped

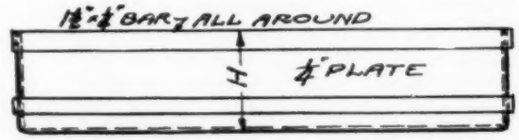


FIG. 3. PLAN OF STEEL ANNEALING PAN AS MADE BY QUIGLEY FURNACE AND FOUNDRY COMPANY, NEW YORK.

annealing the body of the shell is subjected to a semi or flash anneal. In this plant's practice, this consists of inserting the shell head-out, into a closed cast iron bell mouth pipe 4½ inches in diameter and 13 inches long,

and reamed by hand to match gauges which are supplied for this purpose. Two annealing furnaces, oil-fired, 8 feet 10 inches in width and 26 feet 6 inches in length, each having a capacity of 3,000 cases per day for the

seven annealing operations per case, are used for the heat treatment and were installed by the Quigley Furnace and Foundry Company, New York. A photo of this company's plant is shown in Fig. 7.

MODERN PLANT EQUIPMENT.

Another plant that is just being equipped has the following specifications:

Each unit is to turn out 4,000 complete cases, every twenty hours and as each case requires seven anneals degrees F. Afterwards they are placed in special made copper wire baskets for pickling and washing, as shown in Fig. 4.

The pickling solution varies in strength somewhat, according to the idea of the various manufacturers, but is composed of about 1 part sulphuric acid to 15 parts of water. The right solution can be determined by using a Baumé scale for heavy liquids which should register 15. The time of pickling varies for from 15 minutes, with cold solution, to 8 minutes with hot. For heating the

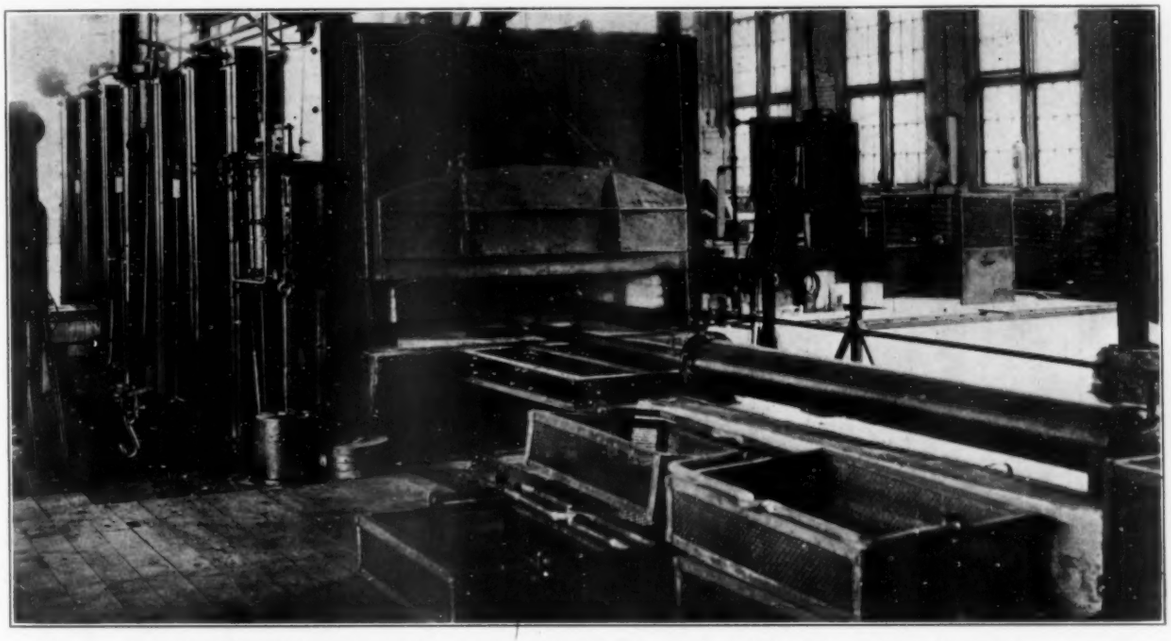


FIG. 4. OIL FIRED ANNEALING MUFFLE AT THE PLANT OF THE CANADIAN CAR AND FOUNDRY COMPANY, MONTREAL, CANADA. NOTE THE COPPER PICKLING BASKETS.

besides the final flash anneal, each unit will require two over-fired, accurate temperature pusher type furnaces, especially designed for this purpose. The furnaces will hold six pans as shown in Figs. 1 and 3. As the cases must be pickled and rinsed after each anneal and as the various draws will not pass through in any regular order, pickle, steam pipes of lead are placed in the bath, as shown in the sketch Fig. 5. The size of the vats and baskets vary according to shop practice, and an average size vat is 4 feet wide by 5 feet long by 4 feet deep inside; as

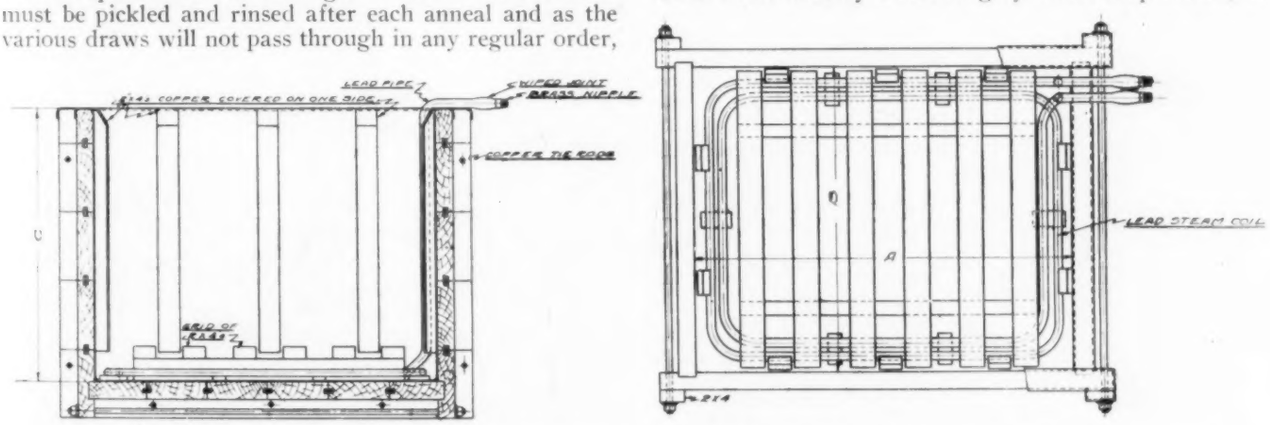


FIG. 5. PLAN OF LEAD LINED PICKLE TANKS AS MADE BY QUIGLEY FURNACE AND FOUNDRY COMPANY, NEW YORK.

by locating the furnaces in the center of the shop will minimize the handling, but they should be placed lengthwise, owing to their length and in order to facilitate handling. The cases are annealed on end in steel pans, made of ¼-inch stock, 4 x 4 feet x 10 inches high, reinforced at the top with a band about ⅜-inch x ½-inch, as shown in Figs. 1 and 3, and are pushed through the furnace, heated at a temperature of from 1,200 to 1,350 shown in Figs. 5 and 6, with sheet lead, weighing about 12 pounds to the square foot, and protected with plank grating on the bottom and 2 x 4 inch yellow pine, strips placed vertically on the sides, beveled at the tops and protected on the inside by copper strips. The vats are fastened together with copper tie rods. After annealing, the cases are removed from the steel pans and placed in the baskets for pickle and wash.

In brass mill practice, the pans are handled on trucks the same height as furnace hearth level, which is 24 inches above the floor.

AN ANNEALING RECORD.

A record of actual annealing practice made at a prominent factory on some of these shells weighing each about 3½ pounds is as follows:

1st draw....	4.083 in. O. D. x 4.35	in. high, anneal 35 min.,	1,200° F.
2nd draw...	4.083 in. O. D. x 4.23	in. high, anneal 35 min.,	1,200° F.
1st indent..	4.231 in. O. D. x 3.45	in. high, anneal 35 min.,	1,200° F.
2nd indent..	4.085 in. O. D. x 4.00	in. high, anneal 20 min.,	1,200° F.
3rd draw...	3.954 in. O. D. x 5.39	in. high, anneal 35 min.,	1,200° F.
4th draw...	3.845 in. O. D. x 7.875	in. high, anneal 30 min.,	1,200° F.
5th draw...	3.789 in. O. D. x 10.75	in. high, anneal 30 min.,	1,200° F.
Heading....	3.74 in. O. D. x 11.7	in. high, semi-anneal 35 seconds.	

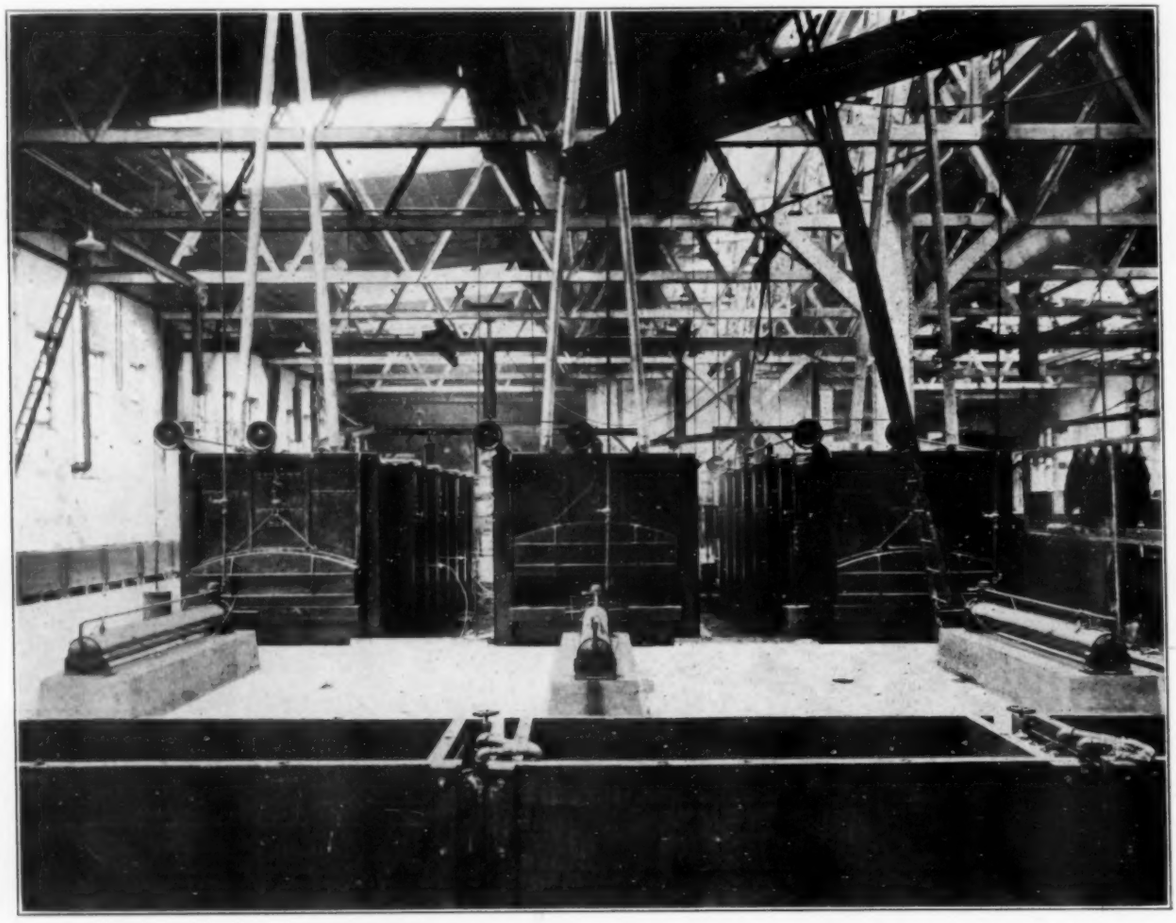


FIG. 6. OIL FIRED ANNEALING MUFFLES AT THE PLANT OF THE MONTREAL AMMUNITION COMPANY, MONTREAL, CANADA. NOTE THE CLOSE PROXIMITY OF THE PICKLE TUBS TO THE MUFFLES.

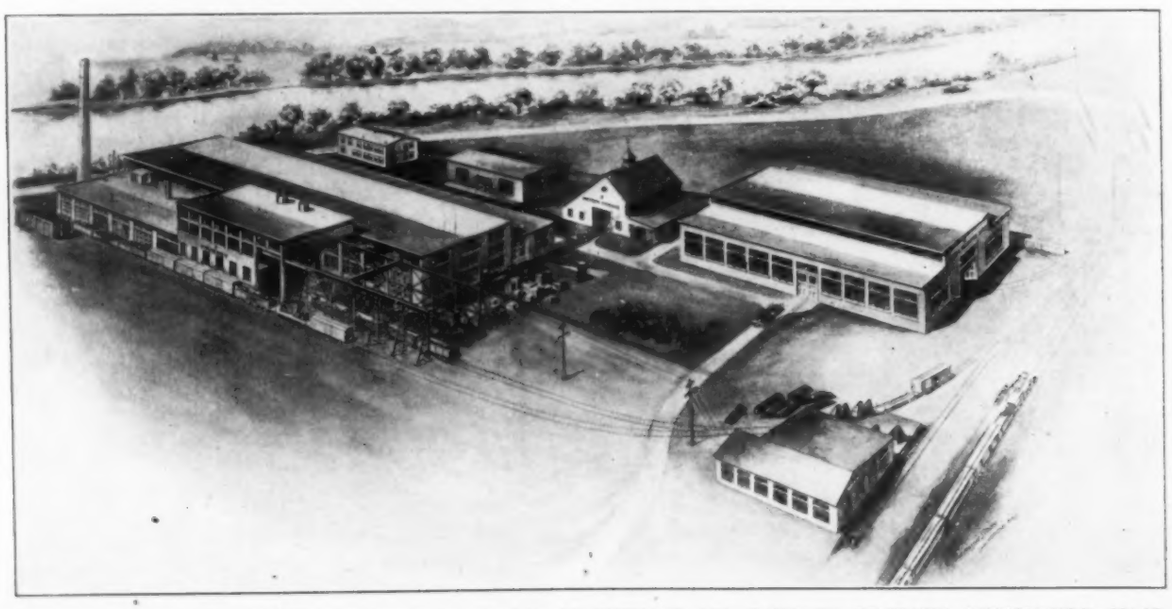


FIG. 7. BIRDSEYE VIEW OF THE PLANT OF THE QUIGLEY FURNACE AND FOUNDRY COMPANY, SPRINGFIELD, MASS.

The last anneal is known as the "flash anneal" and lasts only 35 seconds. It is accomplished at the plant where the above record was made in the flash anneal furnace made by the Quigley Furnace and Foundry Company of New York, as shown in Fig. 8. The anneal is done as follows: The cases are set on the revolving centers seen in the sketch and the gas jets from the side of the Bunsen burners play upon the upper section of the shell. One revolution is completed in 35

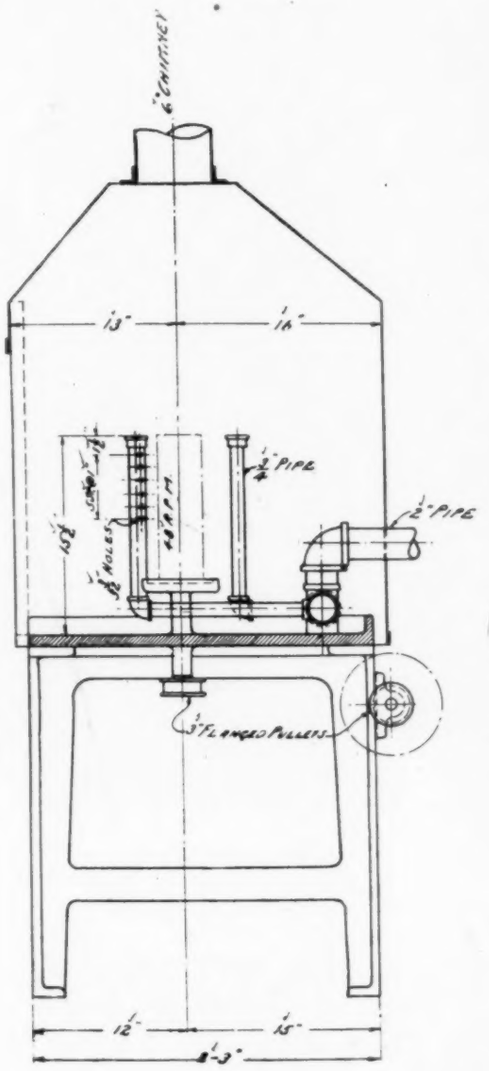
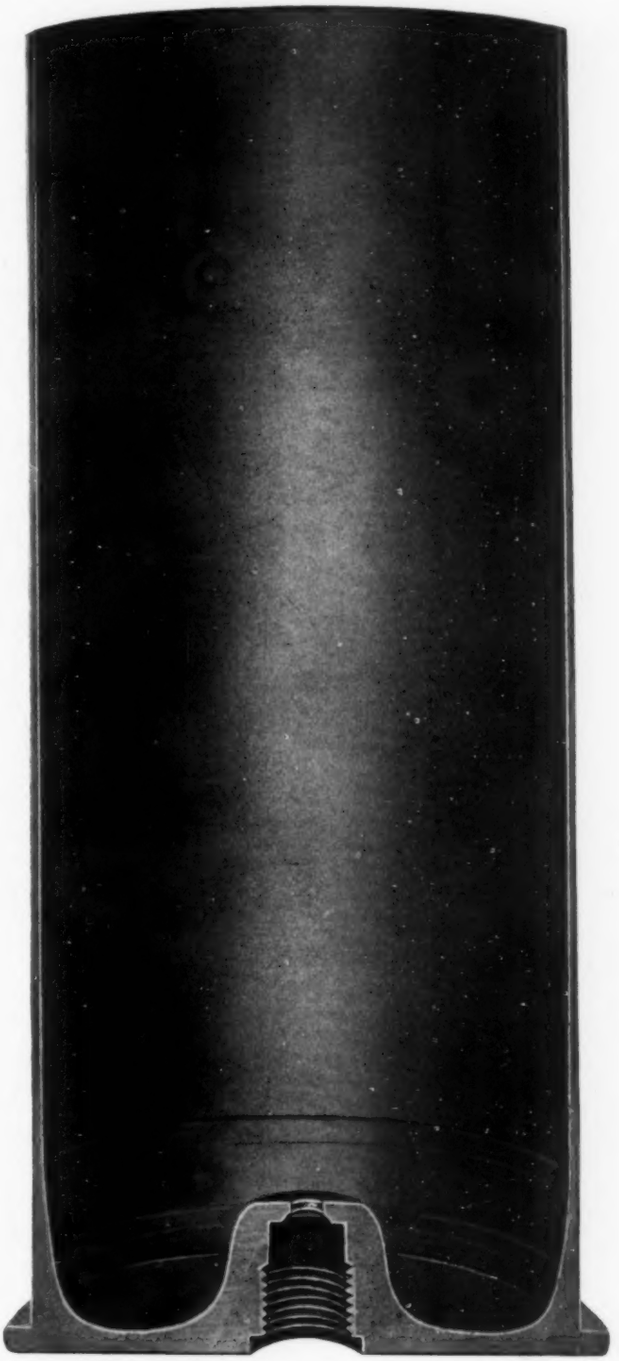


FIG. 8. PLAN OF 8 SPINDLE FLASH ANNEAL FURNACE AS MADE BY THE QUIGLEY FURNACE AND FOUNDRY COMPANY, NEW YORK.

seconds, the required time, and the shell is then taken off and when cool is ready for the final operation. There are usually 8 of these revolving centers in one furnace.

Referring to the process of annealing in the "Glory Hole" as has been described in the foregoing; this is not considered good practice. The shells must be turned in the muffle to prevent crumbling and to ensure uniform heating. A furnace in which the cases are suspended from the shoulders in a vertical muffle, or a special gas burning device as shown in Fig. 8 has given better results.

The practice of using "bulldozers" and other make shift machinery although heralded at a remarkable achievement in the manufacture of cartridge cases has not proved satisfactory. Thousands of cases thus made have been rejected, owing to the unevenness of the walls because the machinery was not properly designed. Manufacturers have therefore discovered as remarked at the beginning



A THREE-INCH BRASS CARTRIDGE SHELL AS MADE BY FERDINAND DEMING FOR THE SPANISH GOVERNMENT AT THEIR PLANT IN TRUBIA, SPAIN.

of this article that considerable care must be exercised from start to finish in the manufacture of cartridge cases. Many of the concerns have since installed suitable presses and other machinery designed for the work.

BRASS FOUNDRY PROFITS

AN ENUMERATION OF THE OBSTACLES ENCOUNTERED IN EVERYDAY FOUNDRY PRACTICE.

BY W. H. PARRY.*

Visions of immense profits to be made in running a jobbing brass foundry have induced many men to try their hand at the game, with the result that but very few succeed and very many fail. There are just as many reasons for the failures as there are for the successes, and to enumerate them all would take several pages of space, so it is best to confine them to those that count the highest.

Bad pattern making has helped to put many a brass foundry out of business, particularly the brand they turn out in the various jobbing pattern shops that are sprinkled around the country. This brand is sametimes called "Back Draft Special," and a molder cannot possibly produce a day's work in a week with such patterns.

We then have the stingy chap who is conceited enough to think that he can make his own patterns, usually out of "cigar box cedar," and whose conception of pattern making and molding is, to say the least, very weird. These poor men cannot understand why a casting cannot be made from their contraptions, and sometimes leave the foundry in a rage on being told that very thing. The best way to treat this class of people is to refer them to your competitor who, as you can tell them, specializes in that class of work, for the chances are that he will do the same to you, as he knows that it is simply impossible to figure a profit from such castings.

Work of a complicated nature should be handled with gloves, so to speak, as most men are not willing to pay for the extra labor and material that must be used on this class of castings.

A case of this kind came under my observation recently and the shock that the foundryman received when he realized what he was up against when the twenty-four cores were eventually assembled in the mold, was only equalled by the shock the customer staggered under when he received the bill. It had been agreed upon that for the first casting no price per pound would be set, but the labor must be paid for whether the casting was good or bad, and as it happened to be good the foundryman did the fair thing by taking the current prices of metals as a basis and adding the labor. When it was finally figured out how much per pound the casting cost the customer, it was found that 84 cents was the actual price for every 16 ounces, and as there was 124 pounds of weight, I leave it to he reader's imagination as to what the customer said. I happen to know, however, that the foundryman lost money on the job, as he did not care to charge any of his overhead expense on that casting.

We are all probably familiar with the "dead beat" and some of his tricks, and any brass foundryman who can successfully duck getting stung from this gentry is a wonder indeed. He is usually well dressed and mannered, voluble of speech and always in a hurry to get the first casting of the order he has given you for fifty or a hundred. He sends the boy around for the first casting, ALWAYS WITHOUT CASH, and if you give it up then it is the end, as you will never see the "deceased beat" again.

The unsophisticated might say: "Well, we have his pattern and he will have to come back," but if all the patterns that are stored up in jobbing foundries awaiting the return of the owners thereof were placed end to end they would encircle this globe of ours three or four times over.

It behooves the foundryman to keep abreast of the times on the market price of the metals both new and old, particularly in these strenuous times when the greed of men make them commit crimes in the shape of "skying" prices when there is no real necessity for doing so. The recent manipulations by the speculators in all non-ferrous metals placed the jobbing foundryman in a predicament that all but put him out of business. His only salvation being to fall back on the old metal market to get his supplies, and the resulting mixtures were of a necessity anything but what the specifications called for. While it was easy to specify "eighty-five and three fives" for the proper mixture for some castings, the chances were, however, that an analysis would show "eighty and three fives, a couple of twos and a one," which, being interpreted means 80 copper, 5 tin, 5 spelter, 5 lead, 2 antimony, 2 nickel and 1 aluminum or iron.

There is a line of castings where the job founder has a chance to make a good profit on if he can get the materials for a reasonable price, and they are made of "cartridge brass," but they are held close to specification and great care must be exercised in making and pouring the mixtures as the shrapnel and cartridge makers are very particular in their requirements, not but what they would send any old brass to the Allies, but if the mixture is not properly compounded and homogenous the shells cannot be drawn.

It is too bad that the business end of the shrapnel cannot be made of brass, as then every brass founder in the land would be on velvet, but it is decreed otherwise and the steel men are piling up the profits just now while the brass founders get only the scrapings.

*Superintendent National Meter Company, Brooklyn, N. Y.

RECORD-BREAKING OUTPUT OF BAUXITE AND ALUMINUM.

The production of bauxite and the consumption of aluminum in the United States in 1914 were the largest ever recorded. The report prepared by the United States Geological Survey shows an output of 219,318 long tons of bauxite, valued at $1,069,194, in 1914, against 210,241 long tons, valued at $997,698, in 1913.

Bauxite is used in the production of metallic aluminum and in the manufacture of aluminum salts, of bauxite bricks, and of alundum. The use of bauxite in the production of the metal aluminum is by far the most important one, and the largest part of the bauxite produced in Arkansas, as well as most of that imported, is used in the aluminum industry.

Alundum, which is used extensively as an abrasive, is made at Niagara Falls, N. Y., by fusing calcined bauxite in an electric furnace. Alundum is especially efficient for the grinding of steel forgings and castings. Only the best grades of bauxite are used in the manufacture of such chemicals as alum, aluminum sulphate, and aluminum salts, as freedom from oxide of iron is desirable for such purposes.

Another use to which bauxite is adapted is in the manufacture of calcium aluminate, which gives a quick set to plaster compositions.

The quantity of aluminum consumed in the United States in 1914 was 79,129,000 pounds, against 72,379,000 pounds in 1913 and 65,607,000 pounds in 1912.

A MODEL JEWELRY FACTORY

A Description of the Plant of The Traub Manufacturing Company, Detroit, Mich.

By C. M. Hoke, B.S., A.M.*

Not often does a view of machinery and shafting afford a background of polished woodwork and clean white walls. Such combinations exist for the most part only in catalogues or amid the tinsel traps of window display. Too seldom in the reality of every day business are lathes and drop hammers associated with well mopped concrete floors; but in the factory of The Traub Manufacturing Company at Detroit such exceptions are the general rule.

As an art and as a craft, jewelry making is old—as old as Egypt; it is one of the most ancient and honorable of industries. It is characterized, moreover, by a tendency to retain the old workman; unlike many other industries of today, it does not discard the trusted man when he grows old. As a result of these characteristics, perhaps, it is also an exceedingly conservative industry, slow to change its methods and its machinery, even at this time when the world is pervaded with the spirit of restless change, when the cry of efficiency, scientific management, and organized economy is heard on every side. Even in the conservation of their precious materials the jewelers are slow to improve their methods.

Much credit, therefore, is due The Traub Manufacturing Company, and their general manager, Mr. E. E. Bross, for the advances they have made in outfitting their plant and improving their systems. The plant is by no means large, but it is modern, carefully thought out, and so adequate that it may well serve as a model, in one respect or many, to plants of much greater acreage. Therefore some of the Traub equipment is described in detail, in the belief that the description will be of interest, if not of positive value, to readers of The Metal Industry.

The building itself is new, being located in an old residence district, where green trees and freedom from smoke and dust add to the comfort (and correspondingly to the efficiency) of the workers. High grade jewelry—platinum, diamond, 18-k. and 14-k. gold,—is the product manufactured.

The stock and time keeper's desk is shown in Fig. 1. The methods and devices used in this department are not unlike those of a retail store. In fact the department deals with the men in the shop much as a store deals with its credit customers. When a workman is in need of anything he presses a button and signals his wants to the stockkeeper who reads his order from the indicator above her desk. The material is at once weighed out according to the decimal system (ounces and thousandths of ounces), and delivered to his bench by messenger or by a basket traveling overhead on a wire. The workman's account is then debited until he repays the amount in finished work. He is, of course, allowed a "rebate" on all unused material, as well as a "discount" for natural loss in handling. The amount of this discount varies with the season. In warm weather hands and tools are warm and moist, a condition very attractive to precious metal filings. In cool weather the loss is less.

FIG. 1. THE STOCK AND TIMEKEEPER'S CAGE, SHOWING THE INDICATOR BY WHICH WORKMEN ANNOUNCE THEIR NEEDS; THE CALCULAGRAPH AT THE RIGHT. BEYOND THE GRATING ARE THE JEWELERS' BENCHES.

Such measures of accuracy are very necessary in an industry where gold and platinum bars, as well as precious stones form the "raw" stock, and stock displaces labor as the greatest of the prime costs. But labor is none the less a factor, and it is recorded with equal care. The task of keeping individual time for many small and quickly completed jobs is simplified by the use of the calculagraph shown in the right foreground of Fig. 1. That these varied and important duties are easily accomplished by one young woman, is striking proof of how even simple devices operate to reduce labor cost.

THE WORKMAN'S MODEL BENCH.

The view through the grating of the stock keeper's cage (Fig. 1) shows a line of benches, uniformly constructed and equipped, under the great windows of the

*Consulting Chemist, the Jewelers Technical Advice Co., New York.

building's west and north extent. Here skilled jewelers do hand work and finishing. In Fig. 2 a workman has stepped aside to show more clearly the construction of his bench and the completeness of his equipment. The bench proper is of steel, while the top is of two-inch maple plank; nor has it the usual "scooped out" working surface, the result of continual chipping and burning. Instead a steel plate one foot square laid into the wood resists burning, scraping or hammering, and because of its wooden base is practically without noise.

A metal drawer contains a complete set of tools in good shape and clean, for the screen-like bottom allows dirt to sift into the trough below. The trough is designed primarily as an apron to catch siftings and filings from precious metal. Once in this trough the dust is easily swept through a small aperture into the little drawer beneath. In the photograph this is shown at the left of each bench.

In order to account for every whit of metal charged to him the workman is obliged to brush his filings into a separate box at the completion of every job. These boxes are themselves of interest. They are of aluminum specially molded to nest in piles. The decimal weight of each is stamped upon the outside, and the job number is written in chalk. Piles of such boxes have proved more satisfactory than any envelope filing system, and afford a convenient and accurate method of taking care of work in process.

Nothing has been spared to furnish each workman with every sort of tool to shortcut or improve upon ordinary methods. In many cases it has been necessary to go outside the market to obtain an implement conforming to the new demands of increased efficiency. Such was the case with the blow-torch which the man is using in Fig. 2. The smallest gas torch offered on the market was too large and cumbersome for the handling of fine work. The new torch, as specially designed by Mr. Bross, weighs scarcely four ounces, and is so small that a man's hand covers it. Both gas and air pressure are controlled by a slight movement of the thumb. It would appear that such compactness would obtain at a sacrifice of heating power, but this is not the case. A spherical mixing chamber at the tip gives such perfect combustion that the flame will melt fine platinum wire. Substantially the same originality of thought that developed this torch has produced numerous other methods and processes peculiar to this organization.

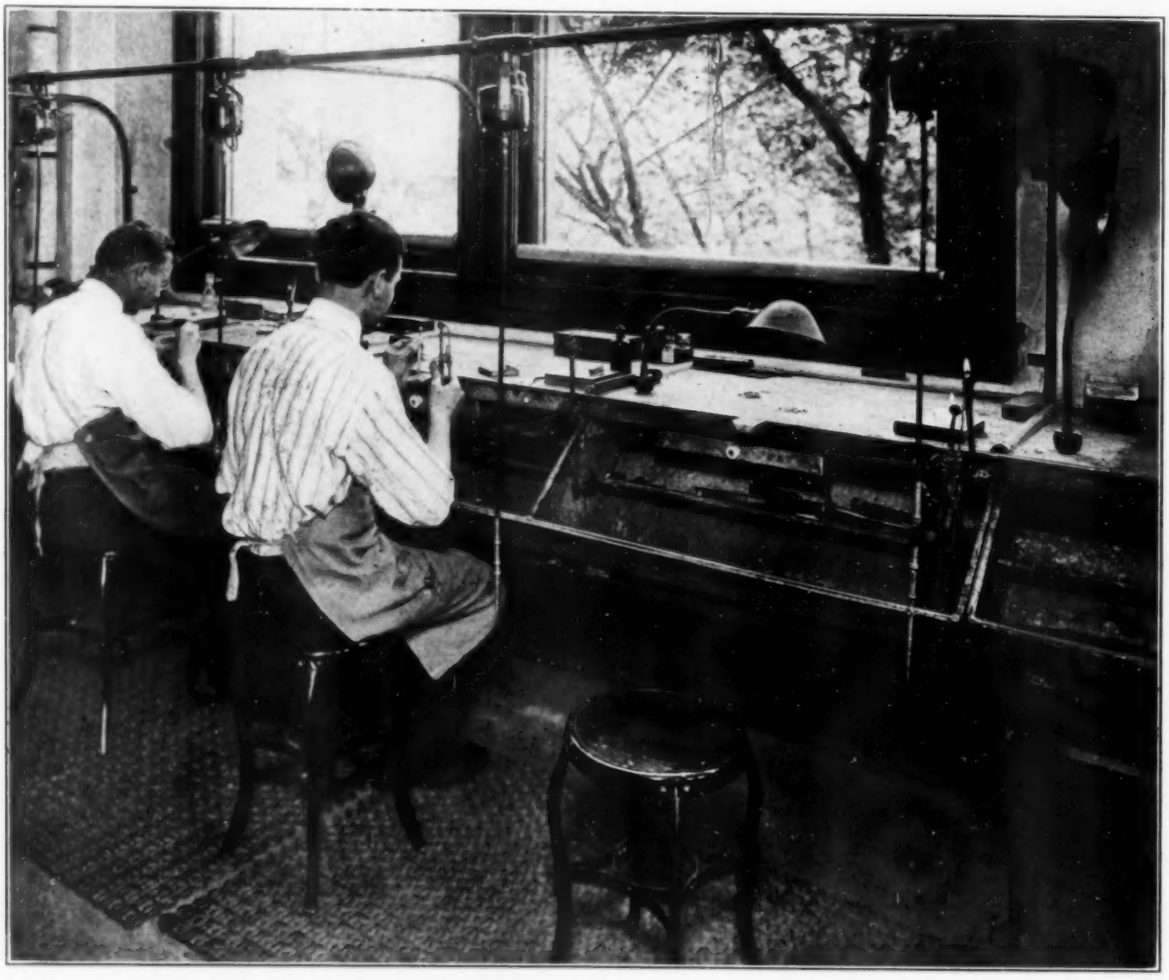


FIG. 2. THE JEWELER'S BENCH, SHOWING PROJECTING STEEL APRON, THE SMALL BLOW-TORCH, THE OVERHEAD MOTOR OF THE ELECTRIC ENGINE ARM, THE ELECTRIC LIGHT, ETC.

Indeed, the blow-torch is only one of the novel details of the bench equipment. Each jeweler also has a foot-controlled engine arm, such as any first-class dentist would be proud to own. Each of these tools is driven by a separate multi-speed motor, suspended overhead, and for each one there is a complete line of attachments used in boring, polishing and hammering. Motor and attachments are so hung that they can be detached and replaced in thirty seconds, when in need of repairs.

When not in use the arm hangs conveniently at the right, out of the worker's way.

The electric light at each bench is mounted on a flexible tube, and can be adjusted to cast light from any angle. All wires and pipes of gas and compressed air for the torches are conduited under the bench, a detail which adds to good appearance and efficiency. There is very little about this bench that resembles the old style jeweler's bench with its wooden construction and movable drawer for catching filings. With such equipment at the die foreman's bench, while the furnace itself is in a distant room. The rheostat is of special design. Its segments are marked with the degrees Fahrenheit which the current generates at each contact. When the rheostat is set, the heat in the furnace quickly rises to the exact amount desired. Thus the necessity of watching a gas or charcoal furnace, and the uncertain practice of judging temperature by the human eye, is eliminated. Instead, absolute accuracy is obtained with minimum attention.

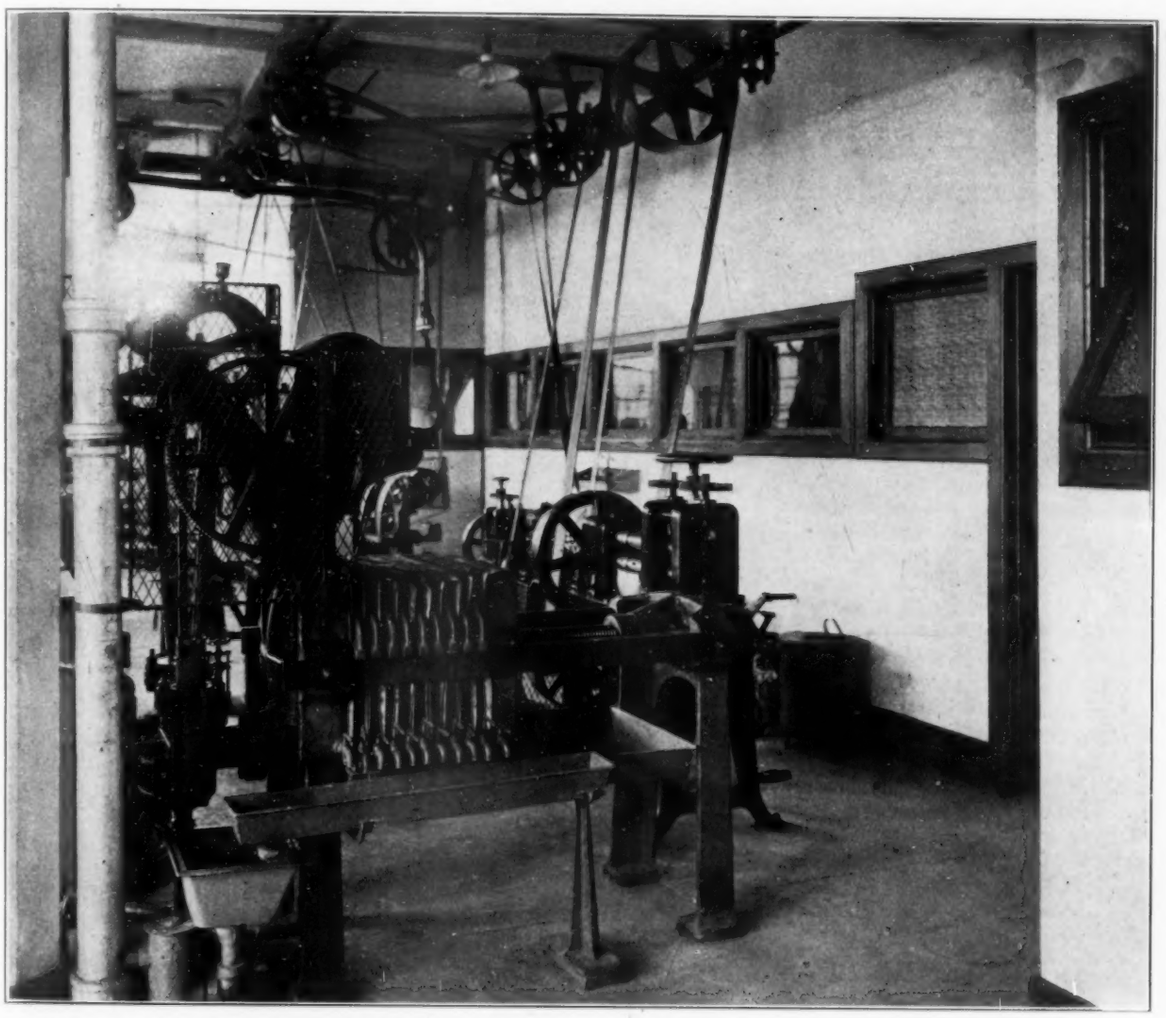


FIG. 3. THE FILTER PRESS FOR FILTERING PRECIOUS MATERIAL OUT OF THE WATER USED IN THE FACTORY.

the men saved filings if they happened to think of it. Quantities of costly dust vanished into the lap or on the floor. At first the steel apron, as a permanent fixture, protruding forward beyond the edge of the table, was condemned by the men as an inconvenience. Except for the task of becoming accustomed to it, no objection has been raised to offset the great advantage of having a reliable apron always in its proper place. Altogther the satisfaction which this type of bench has given more than justifies the innovations it includes.

DIES AND TOOLS.

The die and tool making methods in this factory, while conforming to the established practice, are not without distinctive features. Aside from a good equipment of modern power tools, there is a special electric furnace for hardening, whose heat is controlled by a rheostat and indicated by a pyrometer. These instruments are located

METAL SAVING DEVICES.

Steel mats on the concrete floor prevent the grinding of filings into the floor and the men's shoes, and at the same time make for neatness and comfort. Inside each exit lies a cocoa mat, on which all workers wipe their shoes thoroughly before leaving. The dust from these mats is carefully collected, and finally the mat is burned; the result of each burning is commonly more than enough to pay for a new mat. A very complete laboratory is maintained where experiments are usually in progress.

In addition to the sand blasts and gas furnaces of the usual type for melting and refining gold there is the high-temperature outfit for melting and welding platinum, which is operated with gas and compressed oxygen. It is worthy of note that all crucibles used in the melting furnaces are ground up in a special machine which re-

duces the used crucibles to a powder, and flattens out the adhering bits of metal, so that they may be removed by sifting. In this way much metal is recovered without going through the usual process of smelting and refining. The dust is treated with other refuse. All precious metal filings and scrap are refined on the premises, and by the most approved methods.

THE PLATING ROOM AND APPLIANCES.

The plating apparatus is unique. The whole equipment, of course, is in miniature because of the small size of the articles to be plated. On one side of the small room beneath a large exhaust hood are crocks of plating solution whose covers rest flush with the box-like table that supports them. All platers have been confronted with the task of keeping different liquids uniformly at different temperatures, a condition essential to the success of the plating process. To accomplish the purpose, Mr. Bross designed and installed a simple thermo-syphon system, much like the "differential thermostat" used in biological laboratories. It is much simpler than its name, and consists of a covered wooden tank with a number of compartments into which lipped crocks are suspended. Into these compartments, and around the crocks, hot water is allowed to circulate in quantities varying with the amount of heat desired. Consequently a separate and even temperature attaches to each solution. The water is heated in a coil by gas flame, and circulates of its own accord.

Another special arrangement in the plating room is an instantaneous dryer for wet articles. A foot pedal releases a blast of hot dry air which shoots forth at high pressure and drives all moisture off into vapor. On another side of the plating room are the buffers and polishing wheels which necessarily wear off small bits of substance from the articles which are applied to them. Care was taken to select the most complete equipment for saving all dust from this operation. The dust-saving outfit differs materially from that ordinarily used in a polishing room; a much smaller force is required than in the average blower, but by a system of mild air-blasts from the front all stray particles of dust are brought into the influence of the suction. This mild blast is a portion of the spent air from the blower, being returned for a second filtering. The filtering arrangement is so nearly perfect that a clean white cloth placed next to the exhaust shows hardly a discoloration after many hours' exposure.

THE LAUNDRY AND METAL RECOVERY FILTER.

The care taken to recover precious particles from the air is duplicated for water used in laundering and cleaning. But water goes through a different type of filter. The water filter-press is shown in Fig. 3. In the left foreground of the picture is a power-driven pump which presses the used water into compartments between metal plates and heavy canvas mats. The high pressure of the pump forces liquid through the mats, while all solids are arrested. When the filter is dissembled the refuse is removed in semi-hard cakes. Chemical analysis of this substance shows the presence of value more than enough to justify the extreme care used in cleaning. All soiled clothing, towels and aprons are laundered in the plant, and sweeping and scrubbing are undertaken on a scale that appears to be extravagent, but really is the opposite.

This care, obviously, is not due to hobbies of overscrupulous management or to any particular aversion to dirt. Curiously enough the object in cleaning is to obtain dirt, rather than to be rid of it, because its value in precious metals is so high. The relationship existing between pleasant surroundings and personal efficiency among the workmen is slowly being recognized in all industries; in the jewelry factory the value of cleanliness is thus two-fold.

Situated as they are, far from the centers of trade such as Newark or Providence, the Traub people were not influenced by the traditions or superstitions of the past, but worked out their own salvation. Thus they met both the advantages and the handicaps of the pioneer.

The result of these efforts toward progress and efficiency is a successful business housed in a thoroughly modern and well equipped factory. To one who has visited many jewelry factories and has seen the conditions in certain New York garrets and basements in which the wastage of time, metal and human energy is so great and so unnecessary, the spirit of progress that pervades the Traub plant is an inspiration and an encouragement and we hope its influence will rapidly spread.

TUMBLING BARREL ("JIM BUTLER") WORK

AN INTERESTING DESCRIPTION OF THE MECHANICAL POLISHING OF METALS BASED ON LONG EXPERIENCE.

BY T. C. EICHSTAEDT.*

The process of polishing castings in tumbling barrels is a very interesting subject to any one who is at all connected with the finishing of metals. The tumbling of castings for the purpose of cleaning the sand from the metal has been in practice for some time and also for the brightening of castings. This process is well known in all gray iron foundries; how jacks are used with the castings, speed of barrels, loading them and knowing how to pack the barrels in order to get the best results, and the least breakage needs quite an experienced man.

But as it is the polishing of castings that I intend to write about I shall not at this time dwell on the cleaning process.

For this process a suitable barrel should be purchased, and stove castings will be the particular class of work about which I will write. In every stove factory there are a number of castings that can be polished in a tumbling barrel, plated in a tumbling barrel and buffed in a tumbling barrel and one not connected directly with the polishing and plating department cannot tell the difference in the finished article, except that the one finished in the tumbling barrel looks better and brighter and more evenly polished than those polished on a wheel and plated in a still tank and buffed on a wheel.

The barrel for the polishing operation should be one made of an iron cylinder about 5 feet long and 24 to 36 inches in diameter, with close fitting cover and also a cover perforated with 3/8 or 5/16 inch holes. For the first operation the barrel should be filled up to the cover with work and this work should consist of assorted sizes of different pieces or parts of the stove castings, such as turn buckles, oven and closet door handles, handle lugs and catches, pipe clamps, pipe brackets for gas ranges and heaters, stove lifter and poker handles and even some stove feet of the smaller kind. All these parts can be and should be polished and buffed in the barrel process. One barrel is all that is needed unless there is work enough to warrant installing more, but one barrel, however, is enough to experiment with.

*With Illuminating Engineering Co., Detroit, Mich.

When the barrel is filled to the cover with castings then put in one wheelbarrow load of sea sand, an ordinary sheet iron wheelbarrow that is used around the foundry for wheeling sand. This sand will run down between the castings, then put in five pounds of caustic soda or lye and fill the space in the barrel above the castings with coke screenings such as are not fit for use in the cupola. Next turn a stream of water into the barrel until the barrel is completely filled up, and fasten the cover on tight so that it will not leak. There should be a hole through one end of the shaft, the same as in a barrel used for cleaning castings, and the hole should be plugged up with a cork during the operation as sometimes the friction caused by the continuous running of the barrel creates heat and consequently expansion, and if there is not such a safety provision made an explosion might occur and some damage caused. I have known of a fatal explosion caused by this very thing, so by having the hole in the shaft and a cork in it, it acts the same as a safety valve on a boiler and simply blows out the cork, and then the barrel can be stopped and another cork replaced and the operation continued. The barrel should be allowed to run from four to six days, if only in the day time, but this time can be shortened by running continuously day and night. It should run at least fifty hours and during that time it should be looked after and not allowed to run dry or leak. When the cover has to be removed for any reason whatever, care should be taken not to open it too suddenly, for if it is, dirt, muck, etc., will fly all over. Care can be used to open the cover a little at a time or what is a still better plan is to have a hole drilled in the cover and a 5/16 or ⅜ of an inch cap screwed into it. Then before taking the cover off, this screw can be taken out first and in this way the air released, thus preventing the muck or dirt from flying out.

When the cover has been removed and some of the castings inspected and found to be polished smooth enough, then a stream of water is turned into the barrel until it is filled. If, however, the castings are not smooth enough and there is no more grit in the barrel to do any more grinding, another load of sand should be put in the barrel and another charge of coke and lye and finally filled again with water. But if the castings, as mentioned above, are smooth enough the barrel can just be filled up with water and perforated cover replaced and then run until all the water is out of the barrel. This can be done two or three times or until all the dirt is washed out of the barrel. It will be noticed that the castings are all smooth, but not bright and in order to brighten them the space left in the barrel should be filled with blocks of wood (white pine preferably) or maple. Care should be taken that no hemlock, spruce or other woods that contain rosin or pitch be used. The blocks should be small, and as in most every stove foundry there is a carpenter shop there can always be a supply of the blocks on hand for this purpose.

The reason for using the blocks to fill the barrel is so that the castings will not fall so hard and also so that the blocks may mix with the castings and brighten them. After the barrel has been filled with the blocks the cover should be put on and the barrel allowed to run for at least five hours. After which the castings should be inspected, and if not bright by that time the barrel should be filled up with shavings from the planing machine. The barrel should be started again and run until the castings are bright, and then without any other operation they can be taken out, sorted and plated in a rotary plating machine, process of which will be described later.

The proper speed for the polishing barrel is from thirty to forty revolutions per minute. I have operated the barrel as high as fifty-two, but found the best results could be obtained at forty revolutions per minute.

Another good method would be to have a steam pipe near the barrel to heat the last rinsing water, although this is not necessary, but it is much better to have it as the castings are dried much quicker than if the steam is not used. For the last or rinsing operation the barrel should be run at about one-half hour to forty-five minutes, if the steam is not used, but if it is twenty minutes is all that is needed to dry the castings, and if the castings are not thoroughly dry before the blocks are put in they are liable to be spotted due to the shavings from the blocks sticking to the wet castings.

Pipe elbows and tees cannot be polished in this way with other castings, but should be put in a barrel by themselves, using the same process. If there does not happen to be enough tees or elbows to fill the barrel then blocks can be used to fill it up, but the blocks should be taken out before running the barrel dry and dry ones put in their place for polishing the elbows and trees. It is not economical, however, to plate the tees or elbows that are larger than one-half inch in the plating barrel.

This method of polishing cast or malleable iron and even steel castings is much more economical than polishing on a wheel, and the castings will also be found to be polished more evenly. Even if the castings are not polished sufficiently enough for certain classes of work it will be found that it pays to put them through the barrel process first and polish on a wheel after, for by this method at least two wheel operations can be saved, as all that will be necessary is one wheel. On pipe elbows and tees and all small castings the mold mark should be ground off before putting them in the barrel, and gates should also be ground off smooth.

To the old time polisher this method is the realization of the old time Jim Butler, of which so many have heard. Jim Butler was a myth in almost every well organized polishing room about the years 1893 to 1896. Some one would start the story that a new man was coming in to work in a few days or next week and this man was Jim Butler. He was supposed to be a wonder, a regular horse, such as never had been heard of before. He could polish five to six times as much work as any other polisher and he would do it regardless of what any one said or did, so in order that one might not be shown up by this man, the one telling this story would state that the shop committee was taking up a collection in order to give it to Jim Butler and with it request him not to take the job, but hike to some other town. Of course, he would go, for we would all meet at a certain place, generally some one's house and Jim Butler would be there, and if persuasion would not move him to the next town then we would use force, etc. All who did not know of Jim Butler, as a myth would contribute one dollar freely to the committee and they would order refreshments, and then when the contributor came they were introduced to Jim Butler and every one seemed to enjoy the evening. Consequently the tumbling barrel process or method is dubbed "Jim Butler."

CYANIDE IN BRASS PLATING.

In the article by Charles H. Proctor on the plating of die castings published in the July issue of THE METAL INDUSTRY the amount of cyanide necessary to take the metal cyanides in solution was omitted in the formula for brass plating. The amounts necessary are as follows:

Sodium cyanide 129%.....4½ ounces
Cyanide mixture 98-99%.....5¼ ounces

SPELTER—ITS MANUFACTURE AND PROPERTIES*

A Resume of the Effects of Impurities in the Metal.

By G. C. Stone.†

IMPURITIES IN SPELTER.

The commonest impurities in spelter are lead, iron and cadmium. Arsenic is also quite common, but very little attention is paid to it. All of these impurities are derived from the ore and will be found in the spelter if they occur in the ore. In other words, it is impossible to make pure spelter from impure ore. The extent to which the different impurities in the ore go to the spelter varies considerably.

When lead is present in the ore in very small proportion (about one of lead to a thousand of zinc), practically all of it will be found in the spelter. As the proportion of lead to zinc in the ore increases the proportion of the total lead that goes to the spelter decreases. It is difficult to make a spelter containing much over 2 per cent. of lead, no matter how much the ore contains. Lead and zinc make fairly homogeneous alloys up to about 1 per cent. of lead. When more is present it segregates badly.

Iron behaves quite differently, and the amount of it found in the spelter depends mainly upon the way the smelting is conducted and not on the amount in the ore. It is possible to make spelter as free from iron from ore that contains 10 per cent. or 12 per cent. as from ore that contains .1 to .2 per cent. The two causes that mainly contribute to the presence of iron in the spelter are careless drawing, by which part of the charge is drawn into the condensers and poor scrapers which wear off and introduce particles of iron.

Cadmium is much more volatile than zinc and a good deal of that contained in the ore escapes condensation so that the spelter never contains as much cadmium as the composition of the ore would lead us to expect.

The behavior of arsenic has not been much studied, but we know that it is found in the spelter whenever it occurs in the ore.

Aluminum and tin are never found in virgin spelter, that is, spelter made from ore. Tin never occurs with zinc, and aluminum is not reduced under the conditions occurring in a spelter furnace.

The following table gives the analysis of typical samples of the various grades:

TABLE.

Pb.	Fe.	Cd.
HIGH GRADE.		
.010	.026	0.04
.041	.014	None
.035	.014	None.
INTERMEDIATE.		
.095	.009	None
.190	.017	None
.123	.011	0.12
BRASS SPECIAL.		
.343	.026	None
.474	.013	None
.680	.010	0.274
PRIME WESTERN.		
.87	.062	.023
.644	.013	1.09
1.27	.011	.079

STRENGTH OF SPELTER.

Spelter is a highly crystalline metal and its tensile and transverse strength depend entirely on the size of the crystals. The tensile strength varies from about 2 tons per square inch with coarsely crystalline specimens, to 7 tons with very fine grained ones. The composition does not appear to influence the strength greatly.

The transverse strength also varies with the crystallization, being greater the finer the grain The modulus of rupture varies from 4 to 11 tons per square inch with deflections of from 0.09 to 0.44 inch on a span of 12 inches. There is no definite relation between the modulus of rupture and deflection. The purer the spelter the higher the deflection it will stand without cracking.

The compression test pieces were cylinders 1 inch in diameter and 2.6 inches long. The load necessary to compress these at 10 per cent. and 20 per cent. was determined:

Names	10%	20%
High Grade	16,500	23,095
Intermediate	16,065	23,095
Brass Special	18,310	26,000
Prime Western	20,570	28,620

The resistance to compression increases with increase of impurities. The effect of the different impurities varies greatly. Lead has but little influence. Iron has comparatively little influence. Cadmium increases the resistance to compression very greatly. A cadmium-free Brass Special spelter required 17,190 pounds to compress it 10 per cent., while a Prime Western spelter with 0.32 per cent. cadmium and about the same quantities of lead and iron as the other required 27,340 pounds. In another case a cadmium-free metal required 16,500 pounds for 10 per cent. compression, while the same metal to which .2 per cent. of cadmium had been added required 26,870 pounds. For 20 per cent. compression the cadmium-free required 24,000 pounds and the metal with .2 per cent. cadmium 37,000.

EFFECT OF IMPURITIES.

Lead.—Lead in moderate quantity tends to make spelter softer in rolling; in galvanizing it has a tendency to weaken the coating and make it more liable to peel when the coated metal is bent. Present in quantities about .7 per cent. it tends to produce bad cracking in spelter castings. In brass it tends to make the alloy more brittle and liable to crack.

Iron.—Iron hardens spelter and makes it more brittle. This effect seems to follow through all of its uses. In galvanizing excessive iron also tends to make more dross, the iron being present in the form of a solid alloy, gradually settles to the bottom of the pot; though this effect is slight, as much more iron is added to the bath by the containing vessel and the material being galvanized than can possibly be present in the spelter.

Cadmium.—The effect of cadmium is to harden spelter greatly and make it more brittle. In galvanizing this is very important as the brittleness due to the cadmium causes the coating to peel off. This is of particular importance in telephone and telegraph wires which are sharply bent in making splices. If the zinc contains appreciable quantities of cadmium the coating peels off at these points and the life of the line is much shortened. Cadmium has a strong tendency to make castings crack. In brass cadmium tends to act like lead and is also said to make the metal more sensitive to heat treatment. Luckily for the brass makers a large part of the cadmium in the spelter they use is volatilized and lost so that the amount in the resulting brass is insignificant and

*From a paper read before the American Institute of Metals, Chicago, Ill., September, 1914. [As this paper was read in manuscript it was impossible to publish it before this time.—Ed.]

†New Jersey Zinc Company, N. Y.

is rarely large enough to cause trouble of any kind.

Arsenic.—In the ordinary uses of spelter, arsenic in the quantity in which it occurs does not appear to have much effect. When used for generating hydrogen to be used in lead burning, it does, however, have a very important influence, making it impossible to burn a strong seam.

In general the purest spelter gives the best results, and very pure spelter can only be made from pure ores. There are several refining processes which reduce the amounts of some of the impurities and have little effect on others. In Europe it is customary to remelt all of the lower grade spelter corresponding to our Prime Western. This is done in large reverberatory furnaces holding as much as 15 or 20 tons of spelter, which are heated to a temperature just sufficient to keep the metal liquid. A considerable part of the lead and some of the iron settles to the bottom of the furnace, and the purer zinc is ladled from the top and cast for sale. The lead is reduced to about 1 per cent. and the iron to about 0.03 per cent. Cadmium is very little affected, as it dissolves in the zinc in amount up to 1 per cent. and, therefore, cannot be separated by liquation. The main advantage is not so much in the reduction of the amount of impurities as in the production of a more uniform grade of metal.

In this country the so-called refining is usually the treatment of scrap and galvanizers refuse in the production of what the Government calls secondary zinc. The product made is of uncertain quality and usually contains impurities, notably tin and aluminum, not found in spelter made direct from ore. While some of this material shows a fairly good chemical composition, it is usually hard and brittle due to excessive cadmium, and will not produce the results for galvanizing, alloys or castings that can be obtained from good virgin spelter.

CASTINGS.

Spelter is largely used for making ornamental castings, mainly what are known as slush castings, that is, those in which the metal in the mold is poured back into the ladle as soon as a thin layer next the mold has set. These castings are made as thin and light as possible to economize metal, and a material that will not give light castings is, therefore, unsuitable. The castings must be sound, not merely for strength, but because they are all ornamental in character. A single crack (or even two or three), if not large enough to seriously impair the strength, is not fatal, as such cracks can be soldered and finished so as not to show. The most objectionable cracks are the very small ones that are not visible, because the plating solution gets into them and does not show until the work is finished, when it comes to the surface, producing stains that ruin it.

The molds are usually made of bronze, and many of the shapes are such as to cause excessive strains. The castings are polished and plated or otherwise finished. It has long been known that such castings could only be made from pure metal, but I do not know of the effect of the different impurities having been studied.

Our first experiments were made with a very simple and easy casting, and indicated that iron up to .07 per cent. had no bad effect, and that both lead and cadmium greatly increased the tendency to crack when present in considerable quantity. We next made slush castings of a fairly difficult shape, starting with the pure, high-grade spelter, to determine the necessary conditions. We then made a series of alloys by adding lead directly to zinc at a temperature of 700 deg. C. (1,292 deg. F.), the metal being kept well covered with charcoal and stirred for ten minutes with a rod of fused silica. The cadmium alloys were made by melting together pure spelter and an alloy containing 1 per cent. of cadmium. Each of the lead alloys was used as the base of a lead-cadmium series, the necessary amount of the 1 per cent. cadmium alloy being added.

The alloys were melted in 80-pound lots in No. 45 Dixon graphite crucible, the alloy containing the least amount of impurity in each series, being made first and the crucible carefully scraped and cleaned with sandpaper before being used again. The following method was adopted as the result of the experiments on pure spelter. The charge was melted, stirred and brought to approximately the desired temperature, 435 to 460 deg. C. (815 to 860 deg. F.), and three castings were poured to heat the mold. These castings were set aside and melted later if it was necesary to cool the bath. The temperature of the bath was taken before each casting with a platinum-platinum iridium couple protected by a fused quartz tube. While each reading was being taken the bath was stirred slowly and the galvanometer needle allowed to become stationary. The inside of the mold and ladle were kept well covered with soot from turpentine smoke. Between casts the ladle was kept uniformly warm by placing it directly over the crucible.

The effect of lead alone when present in amount exceeding .1 per cent. is to cause cracking, and any attempt to reduce this by lowering the casting temperature results in the production of castings of excessive weight. Lead does not alloy with zinc at the casting temperature, but separates as small drops or films between the crystals. These form lines of weakness, which cause cracks along the irregular lines where crystals meet. When the cracking is due to lead, there is usually only one large crack extending about half way around the casting and opening about one-thirty-second of an inch and quite frequently to one-sixteenth inch.

Cadmium forms hard and brittle solid solutions with zinc at all temperatures, and we only succeeded in getting two satisfactory castings out of one hundred and sixty, from metal containing .1 per cent. or over of cadmium. When the amount of cadmium does not exceed .2 per cent. the cracks are similar in appearance to those due to lead. With larger quantities of cadmium the cracking is of a much more objectionable form, as there are usually a large number of cracks scattered over the surface, some of which are so small that they are difficult to detect. As would be expected for theoretical reasons, cadmium very decidedely lowers the melting point, and we were able to pour castings from high cadmium alloys at a temperature of 10 deg. C. (18 deg. F.) below that at which pure spelter would flow.

The effect of the presence of both lead and cadmium about equals the cumulative effect of the two if present separately. Alloys containing large amounts of lead (.4 to .5 per cent.) with .1 per cent. cadmium, however, will sometimes give sound castings, but only when their weight is excessive. It is possible that this is due to the soft lead segregated in the joints between the crystals acting as a lubricator and allowing them to slip enough to relieve the strain without cracking.

CONCLUSIONS.

1. Both lead and cadmium are injurious in spelter to be used for slush castings.
2. The lead should not exceed .1 per cent.
3. The spelter should be free from cadmium.
4. It is possible to obtain sound castings from less pure metal, but only by making them excessively heavy.

DISCUSSION.

President Clamer:—This paper, gentlemen, has certainly been exceedingly interesting and practical and valuable. There has been very little information, as far as I know, published along the line of the question of the impurities in spelter and their effect. The casting of spelter objects assumes quite an important field of manufacture, as spelter, your probably know, is used very largely for making cheap statuary and things of that kind of which there is quite a tonnage produced.

Mr. Stone:—Used in making statuary and electric fixtures of all sorts, metal objects, inkstands and dishes and lamps—lamps especially. For some of the slush castings for lamps where the casting weighs six pounds it is necessary to pour two hundred pounds of spelter into the mold. Castings of that kind are very difficult to make and many of the shapes would appear to be impossible. They do some beautiful work with the slush casting.

President Clamer:—Slush casting, to some of you who may not be familiar with it, is a casting which is made by pouring molten metal into a chilled mold and then immediately pouring out what remains liquid.

Dr. Gillett:—I would like to ask Mr. Stone how much cadmium it is necessary to add to get one per cent. in the metal?

Mr. Rigg:—There is very little loss in the cadmium if the temperature is kept pretty close to the melting point of the spelter. When one per cent. is added the alloy will usually contain .95 per cent.

Mr. Stone:—I may say in refining spelter or what they call refining in Europe, they melt the spelter in large reverberatory furnaces holding from ten to twenty tons, and hold the temperature of the spelter just above the melting point, the lead can be separated by liquidation to about one per cent. and bring the iron down to about .03, but this does not affect the cadmium much, as this element does not seem to volatilize from spelter to any very considerable extent.

President Clamer:—What is the volatilization point of cadmium?

Mr. Stone:—It is much lower than that of zinc.

Mr. McFarland:—Does the cadmium keep on going all through the distillation process.

Mr. Stone:—The first part of it, because in the first part, the first four hours of distillation, the greater part of the cadmium goes off, so that the first draw of spelter is always higher in cadmium than that afterwards drawn.

Dr. Gillett:—We worked on the effect of cadmium on the crystallization of zinc and made a series of alloys with varying amounts of cadmium, and instead of making up a rich alloy, if one per cent. cadmium can be termed a rich alloy, we added cadmium directly, and working in the gas furnace, with a number 10 crucible, I was trying to make a two-tenths per cent. cadmium and wound up with about .003. I did not put my couple in until I knew I was about ready to pour, so I did not control the furnace temperature. For six per cent. I got in practically four per cent. That would indicate then that the volatilization of cadmium increases greatly with a small increase of temperature. We got quite interesting results, though it does not help us much on the general proposition, but it was astonishing what a very little cadmium would do on reducing the grain size and increasing the tensile strength of zinc.

Mr. Stone:—We found that for any given composition we would get as much range of tensile strength due to variations in crystallization as we would on metals of different compositions.

Dr. H. W. Gillett:—But in this case the temperature of casting was kept, I think, at 20 centigrade above the melting point of zinc, constant in all cases. There is another point that I want to bring up. In the printed paper of Mr. Stone he stated that the trouble from "brass shakes" and "spelter chills" is certainly due to something else than zinc. I am not familiar with conditions in zinc smelters, and I do not know why it is that they do not have them, but as to the fact that pure zinc does not cause it, there is considerable evidence on the other side.—(Reads discussion.)

On account of the interest of the brass industry in "brass shakes" or "spelter chills," it may be well to comment on Mr. Stone's statement that "this trouble is certainly due to something other than zinc." I am not familiar with conditions in zinc smelters, and therefore cannot guess what happy condition causes the freedom from "shakes."

In the course of the investigations on health and safety in brass foundries, made by the Bureau of Mines, and reported in Bulletin 73, pp. 257-286, I talked with many foundrymen on the subject of "brass shakes." One of these men had previously had experience in a zinc smelter, and he stated that he had there seen cases of chills identical with brass shakes.

Hayhurst[1] says:

"Brassman's ague occurs almost exclusively among workers in brass foundries, but also in foundries in which zinc, alone or alloyed, is heated to boiling. In Illinois the only process in vogue of reducing crude ores to recover the zinc is one of volatilizing the zinc in huge smelters—the Belgian process. Here an investigation showed that the men working around the smelters occasionally suffered from zinc chills, or 'the shakes,' as they are wont to call them. They are not as much exposed to the metallic fumes, however, as men who work in brass foundries. Brass chills do not occur in iron foundries nor in bronze foundries. Neither do they occur among galvanizers, the reason being obvious that in this latter process the zinc is only melted and is not ordinarily heated above its point of volatilization. The method of alloying is of great influence, as the frequency of the chill, other conditions remaining the same, is almost in direct ratio to the percentage of zinc contained in the alloy.

"Although zinc has always been held the metal chiefly to blame for brass chills, its necessary combination with copper has been stoutly maintained up to 1905, when Sigel[2] first showed brass chills occurring in foundries where no copper or iron could be demonstrated in the sublimation product. Sigel came to the conclusion that the chills were due to the entrance into the system of metallic zinc in the form of zinc dust and in *statu nascendi*.

"In the fall of 1910 I found that so-called 'zinc chills' existed among the zinc smelters of La Salle County,[3] Illinois. The raw ore used consists of zinc blende (sulphide of zinc). These ores contain no copper or arsenic, and only traces of iron, lead, manganese, and magnesium; 31 per cent. of sulphur is present, as well as oxides and silicates, leaving less than 1 per cent. of undetermined matter. However, neither sulphur, silicates, nor any of the other metals present are known to produce a chill fever, and sweat syndrome.

"Lehmann[4] was the first to succeed in proving that the syndrome could be produced in man by burning chemically pure zinc. He further concludes that the affection is a direct or indirect zinc poisoning."

As some physicians who have studied this subject have intentionally inhaled the fumes obtained by severe heating of the purest zinc and thus produced typical attacks of "Spelter chills," it is quite certainly not correct that the chills are not due to zinc. In view of the cases cited above, it is not correct, either, that "spelter shakes" are unknown in zinc works. It is, however, a matter for congratulation that such cases should be so rare that Mr. Stone has not met them.

Mr. Stone:—It is extremely rare—in fact, I had been working in zinc works twenty years before I ever heard of it, and we are now working in every smelting district in this country, Virginia, Pennsylvania, New Jersey, Illinois, Kansas and Oklahoma, and I have never heard of a case, and I have talked with a great many other spelter men and none of them had. I first heard of it in the brass business. What do you do for spelter shakes?

President Clamer:—I can speak from experience in regard to spelter shakes. Some years ago when I was experimenting in making manganese bronze I got home one evening and started to feel chilly and finally I got to shaking and got going a little stronger and stronger until finally I started the couch to moving—very disagreeable sensation, I assure you. There was absolutely no chance of there being a contamination from any fudnace gases, and I got it by mixing the zinc in the ladle of copper after the copper was melted, of course at a high temperature. Whether the copper had anything to do with it I don't know,

[1]Hayhurst, E. R., Occupational Brass Poisoning, Brass-founders' Ague. Am. Jour Med Sci., vol. 145, 1913, pp. 727, 730.

[2]Sigel, J., Das Giesfiber und seine Bekämpfung mit besonderer Berüchsichtigung der Verhältnisse in Würtemberg, Vrtjschr, f. gerichl. Med., 1906, xxxii, S. 174.

[3]Hayhurst, E. R., The Brass-molder's secret, The Survey, New York, 1911, No. 26, 879-882.

[4]Lehmann, K. B., Giess-oder Zincfieber, Arch. f. Hyg., 1910, ed. lxxii, S. 358-381.

but there were no furnace gases at all noticeable.

Mr. Stone:—Well, gas poison is a totally different thing. We get that around producers. But that is straight C O poisoning; it is totally different from spelter shakes.

Mr. Bassett:—I have suffered from that trouble a number of times; after violent cases being a little weak the next morning, but that is all. The "shakes" usually take the form of chills and fever. Fever following the chill, and being generally accompanied by nausea; this again followed by another shake and more fever and nausea until the attack is worn out.

Cadmium will give exactly the same symptoms as the so-called "spelter shakes," only somewhat more violent.

Flue dust from brass melting contains a much larger proportion of cadmium than is found in the zinc used, showing that cadmium is more readily volatilized than zinc, as would naturally be expected; how far the effect of cadmium comes into this matter we do not know. The effect on the operator when using zinc free from cadmium, and when using zinc carrying considerable cadmium should be observed. It would be very interesting to know how much of the trouble is due to zinc and how much the associated elements.

President Clamer:—That would rather contradict then the theory that copper had anythig to do with it, because the poisoning by copper is of a permanent nature, that is, comparatively permanent.

Mr. Rigg:—I think there is one case on record of poisoning by inhalation of copper vapor, the case described by Hanson, as having occurred at the plant of the General Electric Company. There they get all the symptoms of spelter shakes, fever and all the rest of it pretty acutely, and it takes them several days to recover. But there were no permanent results. Everybody came around in good shape

Dr. Gillett:—I am inclined to think that those symptoms from copper poisoning were confused. I looked that up pretty carefully and I came to the conclusion that they were quite distinct from brass chills. To get copper vapor you have to reach a high temperature. Copper does not boil till 2,200 degrees Cent. is reached, and its vapor pressure at any temperature we ever get with brass is practically zero; so it would simply be mechanically carried copper that could have anything to do with it. I am sure that cadmium alone is not the only cause of the chills, because we have been working with pure copper and Bertha spelter and remelting our alloys right along, so if there were any trace of cadmium to start with we would get rid of that pretty quick. When we work in a poorly ventilated room we got the shakes unless we are immune. The second day they do not bother us. Of course with us, there are no furnace gases. If one of us works around the furnace, but does not happen to be there at the pouring we do not have any trouble. Absolutely no fumes come around the electric furnace, but it all happens in the pouring, and there doesn't seem to be any cure for it; you have simply got to wait till the next morning. The chief symtoms in my own case—I haven't had very severe cases—but the chief symptoms are disinclination to work and disincliation to eat, and in most cases disinclination to smoke; and when I do that I have got a pretty bad case.

THE PLATING OF THE TROUBLESOME DIE-CASTINGS

SOME VALUABLE ADVICE BY A PRACTICAL PLATER.

BY S. HERRICK.

In the July issue of THE METAL INDUSTRY I read with interest an article by Charles H. Proctor which I consider one of the best I have seen printed in THE METAL INDUSTRY or in any other paper on the plating of die-castings. In this experiment Mr. Proctor used sheet steel anodes, which although give good results could not be considered a permanent fixture, as the plating is done from the solution and very little metal deposits, if any, from the anodes. If a large amount of work is to be done, the solution soon becomes weak and trouble begins, for die-castings cannot be plated successfully in a weak solution.

As I have had considerable experience with die-castings and I may say with very good success, I will try to explain my methods in as simple a manner as possible so that my readers will be able to follow my methods and obtain good results. The solution I have used has always been the standard formula, which is the same as is given in the July issue of THE METAL INDUSTRY, and is as follows:

Water	1 gallon.
Double nickel salts	8 ounces.
Single nickel salts	2 ounces.
Sal ammoniac	2 ounces.
Boracic acid	1 ounce.

In the above solution I used cadmium which I discarded because I could not see where I derived any benefit, but with the addition of magnesium sulphate, of which I have never used above two ounces to the gallon, I have had good results. I have found that magnesium sulphate has a similar action on die-castings in the nickel solution as alum has in an acid copper solution. The streaks disappear while the solution is rich in metallic salts, but when the solution becomes weak they reappear again. In such a case I have found that single salts are the best to strengthen the solution with, being careful not to allow the solution to become too acid and also by adding magnesium sulphate in proportion at the same time. Boracic acid may be added occasionally. I would not advise the use of too much ammonium chloride, as I have found the deposit is not as bright and is much harder to color up. The anodes I have used have been the flat cast nickel anodes, but I always use a fairly high amperage. In so doing the work on the bottom of the wires or racks have a tendency to burn, but I overcome this in a very simple manner by using what is known as a "dummy" when plating a few small pieces so that they will not burn. Why not have one to protect the die-castings also by taking a piece of iron rod almost the same length as the tank and two smaller pieces for hooks, one on each end and long enough to allow the rod to clear the bottom of the racks? I have found this method takes up the burn and leaves the deposit on the die-castings easier to color up and a clear deposit is obtained on all. By the use of a bar at the bottom of the tank one would think that a great deal of nickel is wasted, but when we consider the cost of repolishing and buffing of all the bad pieces, it is paid for over and over again, and also some die-castings will not stand very much repolishing.

Although a great deal of trouble in plating die-castings is in the solution, we must not overlook the troubles that occur before and after plating. At one time I had considerable trouble caused by the die-castings blistering a few weeks after being plated, which I believe was from the aluminum which the die-castings contained. Although I had a good deposit on the die-castings a short time afterwards, these blisters would appear. I was at my wits' end to find where the trouble lay. In washing the work a slight oxide would appear, especially on the buffed surfaces. I washed the castings in the usual potash solution and scrubbed them with lime, after which I would let them stand in the cyanide solution for some time. Now cyanide does not remove any stain from die-castings, but the castings being porous, the cyanide attacks them in a much similar manner as it does iron castings, and instead of spotting out as in a brass solution it blisters.

So I finally overcame the oxide and blisters in the following manner. After the work had been buffed it was scrubbed in benzine before being wired, which removed all of the buff dirt and left the work nearly clean. After the castings were wired I washed them in the usual manner, but did not let them remain in the potash so long. I, therefore, had very little tarnish upon the work, and after scrubbing with lime I left them in the clean water until they were wanted for plating. By following this method I had very little trouble caused by blisters.

I have also followed this method in copper plating or in brass plating and have had very good results. First striking in the nickel solution, then rinsing and then finally immersing in the brass or copper solution.

I believe that if the readers of this article will follow the above directions a great deal of the trouble which they are having with die-castings will disappear forever and this form of plating will have no terrors.

THE "WILZIN PROCESS" OF FLATWARE MANUFACTURE

A Description of a New Method for Producing Metal Articles by Compression Instead of Stamping and Rolling.

The "Wilzin Process" of Flatware Manufacture was invented by Arthur Wilzin, managing director of the E. W. Bliss Co. (Paris). The first patents were issued in France in 1909. Since that time a series of special presses, tools and dies have been developed for the "Wilzin Process" under the direction of Mr. Wilzin, by the E. W. Bliss Company, of St. Ouen (France), and basic patents have been granted in twenty-four different countries. Many of the largest flatware manufacturers have applied for and received manufacturing licenses under the various "Wilzin Process" patents. Others are preparing to use the "Wilzin Process" as soon as the necessary equipment can be delivered by the E. W. Bliss Company (Paris). Among the European "Wilzin Process" Licensees may be mentioned Mappin & Webb, of Sheffield, England, and Christofle & Company, of Paris. The "Wilzin Process" is applicable to the manufacture of all styles and patterns of flatware regardless of the base metal used. Figs. 3 and 4 show some patterns of flatware now being manufactured entirely by the "Wilzin Process."

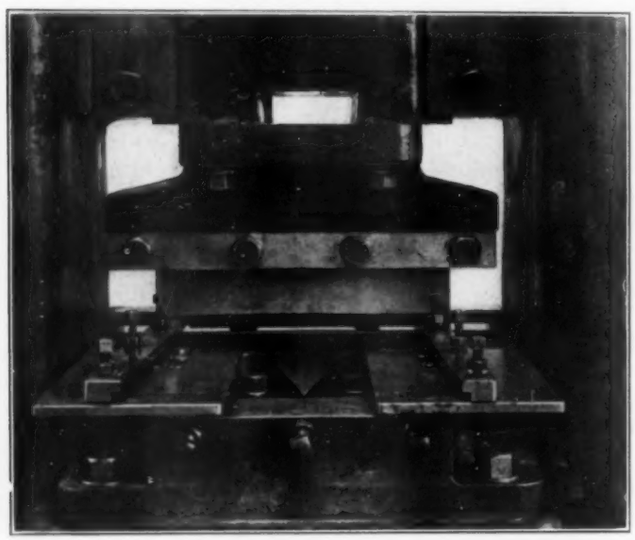


FIG. 1. THE BLISS STRIP-CUTTING-OUT PRESS.

The U. S. patents that have been issued on the "Wilzin Process" to date are as follows:

No.	1,026,421	dated May	14, 1912
"	1,091,415	" March	24, 1914
"	1,098,071	" May	26, 1914
"	1,133,775	" March	30, 1915
"	1,139,390	" May	11, 1915

Applications for further U. S. patents on the process and equipment are pending.

SCHEDULE OF OPERATIONS.

STRIP CUTTING.

The strips are cut from the sheet on a suitable flywheel press, fitted with a simple strip cutting attachment which is adjustable for all sizes of blanks shown in Fig. 1.

Note: Each strip contains sufficient metal to produce two blanks. Strips for very small spoons produce four blanks.

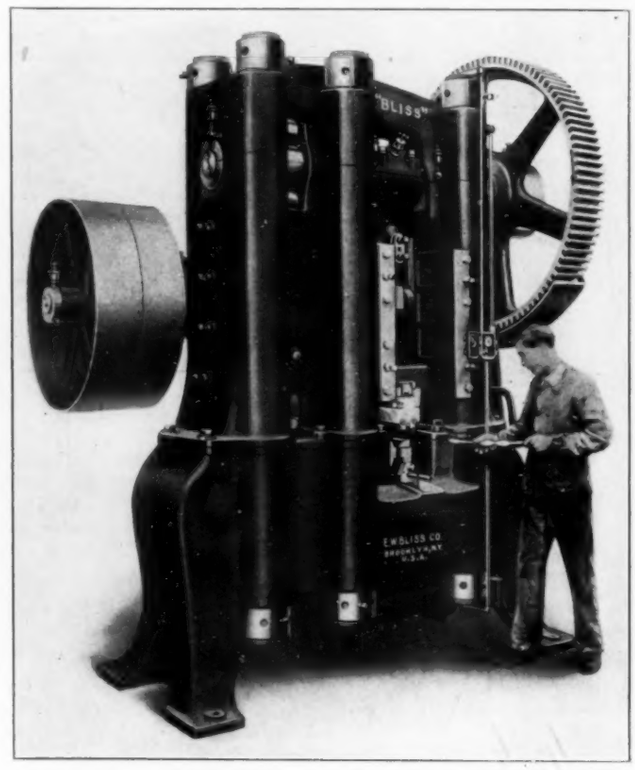


FIG. 2. THE WILZIN QUADRUPLE EXPANSION PROFILING PRESS.

Productions: 50 to 60 operations per minute. 1 strip per operation.

PACKAGE ASSEMBLING.

The strips are next assembled in packages, each package containing 8 to 18 strips according to size.

Note: Each package of 8 to 18 strips contains sufficient metal to produce 16 to 48 blanks; that is, 8 to 18 "two blank" strips (16 to 36 blanks) or 12 "four blank" strips (48 blanks).

PROFILING.

The package of strips is next submitted to the action of the "Wilzin" Quadruple Expansion Profiling Press.

(Figs. 2 and 5.) This press applies a pressure of 150 to 250 tons to all four sides of the package simultaneously. One set of flat dies (suitable for all packages) acts on the flat sides of the assembled strips, and prevents lateral expansion while a pair of profiling dies acts on the edges of the assembled strips (top and bottom) and displaces the mass of metal longitudinally.

The time required for the changing and setting of the profiling tools for the different operations and patterns is less than two minutes. The correct longitudinal and lateral position is located without trial or measurement. End blocks center the punches longitudinally, and the

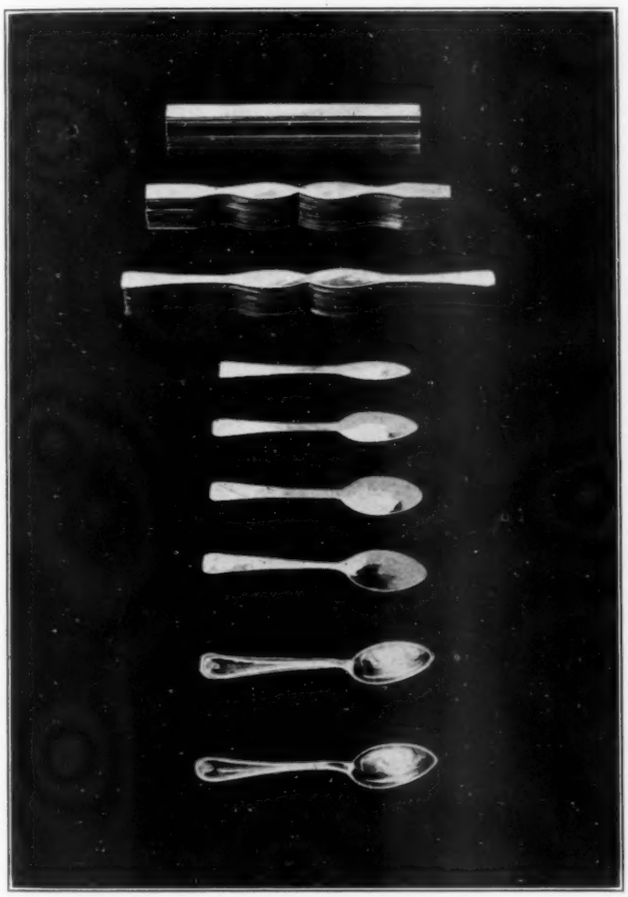


FIG. 3. WILZIN PROCESS OPERATIONS FOR TEA SPOONS.

lateral position is determined by the side pressure blocks. The only adjustments required are for height and back gauge.

The "Wilzin" Quadruple Expansion Profiling Press has been specially designed for the "Wilzin Process," and embodies the well known features of the "Bliss" presses which ensure quick and reliable action. Each of these presses is equipped with a "Pressure Indicator" which records the pressure of each stroke of the press, and enables the operator to quickly set the plunger adjustment without cutting and trying, and without danger of injury to the dies or press.

The very high pressure applied to the surfaces of the metal by the profiling press from all four sides simultaneously improves the structural qualities of the metal, inasmuch as slight flaws and pores disappear, whereas under the cross and grade rolling methods such defects are accentuated and cause wasters.

The life of a set of profiling tools has been found to be in excess of 1,000,000 pieces.

OPERATIONS.

For Spoons: All sizes: Two profiling operations are required, with one change of profiling dies.

For Forks: All sizes: Three profiling operations are required, with two changes of profiling dies.

Other Articles: Two or three profiling operations, according to size and shape.

NOTE: All these profiling operations are done cold, with the exception of blanks for largest table spoons, which require one annealing.

Production: The capacity of the profiling press varies from 7 to 10 operations per minute.

NOTE: 16 to 48 blanks per operation.

Blank Parting: The strips are next parted into individual blanks, in a press fitted with a simple parting tool.

OPERATIONS.

For Spoons or Other Articles: The entire package is parted in one or two operations, according to size. One operation for each "two blank" strip package, and two operations for each "four blank" strip package.

For Forks: All sizes: The strips are parted separately with a combination parting tool and end preparation die.

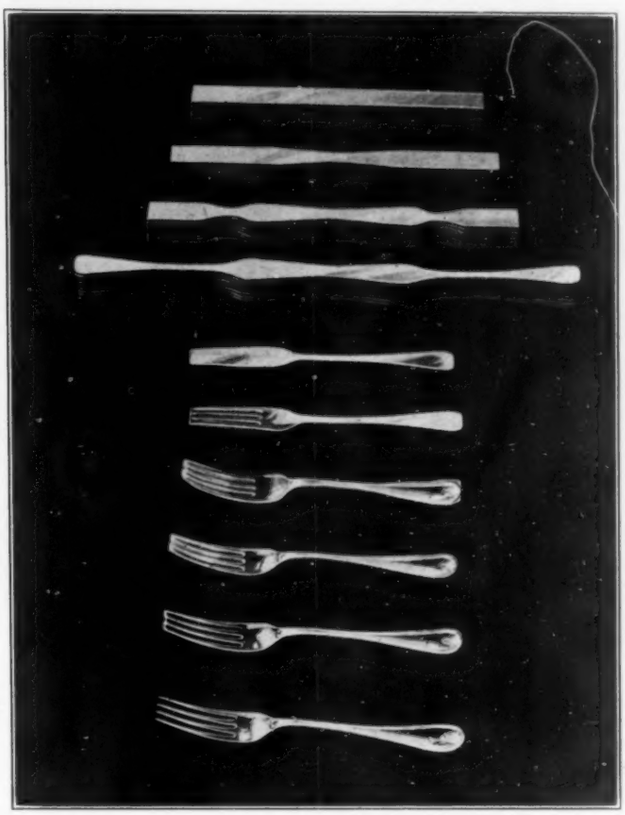


FIG. 4. WILZIN PROCESS OPERATIONS FOR FORKS.

PRODUCTION.

For Spoons and Other Articles: 20 operations per minute. 18 to 36 blanks per operation, for all "two blank" strip packages, and 24 blanks per operation for all "four blank" strip packages.

For Forks: 20 operations per minute, 2 blanks per operation.

END PREPARATION.

The individual blanks are next submitted to the action of end preparation dies which are fitted to presses of suitable capacity, according to the size of the blank. The

lower tool is a hardened tungsten steel block, with its working surfaces absolutely straight, therefore easily ground. It serves for all shapes and sizes of bowls, the contour of which is determined by the edge confining pieces which are simple to make and easy to place in the gauging piece which also remains the same for all sizes. The exact grading of the bowl is secured by the

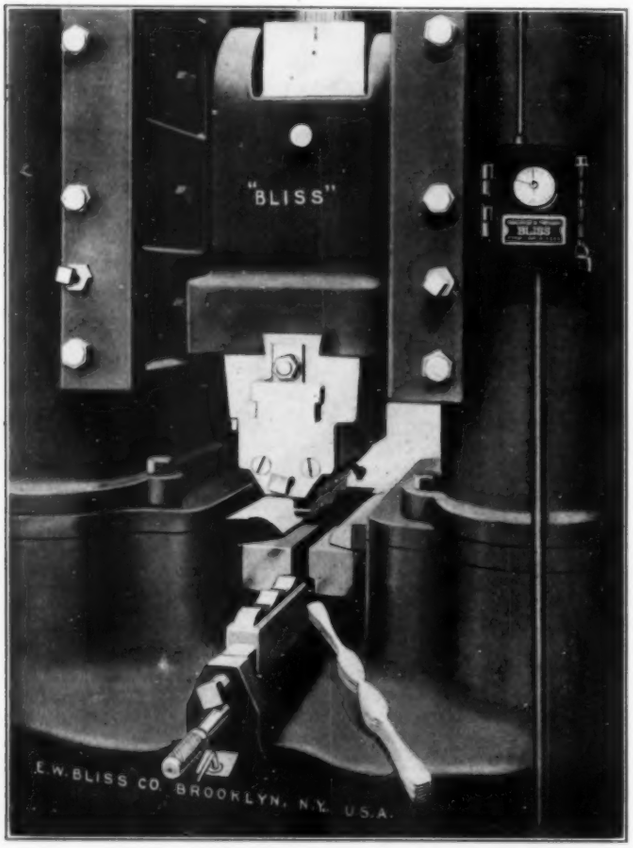


FIG. 5. A CLOSE VIEW OF THE WILZIN EXPANSION PROFILING PRESS.

action of surface punches. It will be understood that by convexing of their surfaces, the bowls are graded so as to secure the desired distribution of the metal, i. e., thin in the center, and gradually increasing in thickness to the edges.

NOTE: By hollowing these punches at the base it becomes an easy matter to accumulate any amount of metal required for relief (convex) flower or figure designs.

OPERATIONS.

For Spoons and Other Articles: Two operations, one change of die.

For Forks: One operation.

Production: For Spoons and Other Articles: 20 operations per minute, one blank per operation.

For Forks: 20 operations per minute, 1 blank per operation.

FLAT POLISHING.

All blanks are next polished in the flat upon a cotton buff.

Production: This operation is generally done by hand, and the output depends largely upon the experience of the operator. In some cases an automatic polishing machine is used greatly increasing production.

NOTE: Close examination of the "Wilzin" blank shows a fine even surface owing to the action of the tools and dies, as explained, thus requiring very little polishing.

EMBOSSING.

The blanks are now ready for the final stamping and embossing with one piece embossing die. (Fig. 6.) These dies are operated in "Bliss" embossing presses which have been specially designed for flatware embossing. The blank is located and held on the die by two steel points of the fixture. These points are automatically drawn away by the action of the press just as the upper die strikes the blank, thus preventing many wasters which result from the inaccurate location of the blanks.

NOTE: The surprisingly high finish of the embossed piece as it comes from the embossing die is due to,

(a) The slow elastic squeeze of the embossing press (250 to 600 tons) permits the complete filling of the mold.

(b) The uniform grade of the "Wilzin" blank. Each blank has the same volume of metal at any given point, thereby insuring the absolute uniformity of the press stroke and of the product.

(c) The combination of the fine even surface of the polished blank with the highly burnished die surfaces transfers to the surfaces of the finished piece the high burnish and luster of the embossing dies.

(d) The "Pressure Indicator" which enables the operator to judge exact pressure which is being applied.

Production: 8 to 12 operations per minute, depending upon the size of the piece; one piece per operation.

FLASH TRIMMING.

The embossed piece now has a slight flash of scrap metal (less than 10 per cent.) around its entire edge, which is trimmed in a suitable size fitted with a simple trimming die.

These tools remove in one stroke the flash in such a way as to permit the finishing of the edges on the cotton

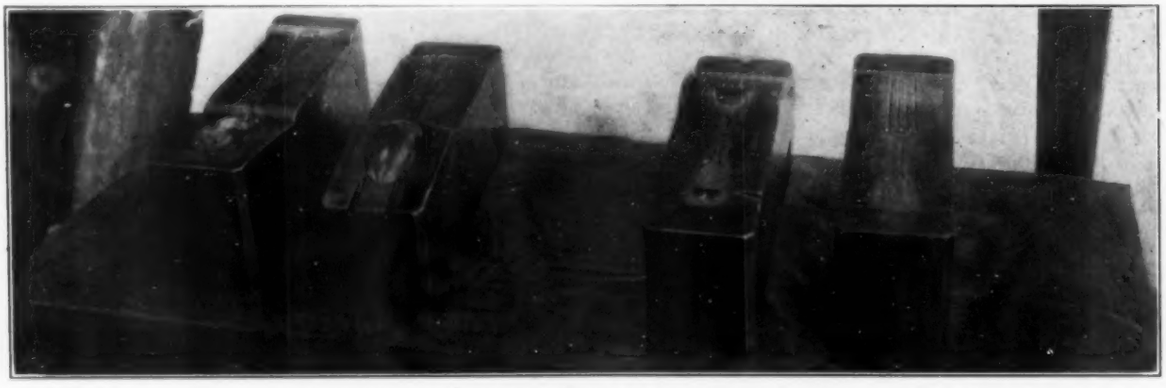


FIG. 6. EMBOSSING DIES OF THE WILZIN PROCESS FOR SPOONS AND FORKS.

buff, thus rendering unnecessary the use of the objectionable emery belts.

NOTE: The reduction of the required allowance of scrap metal to less than 10 per cent. for all patterns of flatware (and to less than 6 per cent for some patterns) allows very important savings to be made in cost of raw materials.

FINAL POLISHING.

This consists of rounding and smoothing the edges after flash trimming, and putting the final polish on surfaces. This latter part of the work is naturally reduced on account of the high burnish and luster of the embossing dies being transferred to the surface of the metal in the embossing operation.

SUMMARY ADVANTAGES OF THE "WILZIN" PROCESS.

1. It eliminates the cross and grade rolling operations.
2. It reduces the applied labor costs of manufacturing the flat graded blanks.
   (a) Low labor costs of press operations.
   (b) Profiling blanks in packages, 16 to 48 blanks per operation.
   (c) Reduction of annealings.
3. It produces a uniform blank.
4. It reduces the applied labor costs of grinding, polishing and buffing.
   (a) The displacement of the metal in profiling operation (elongation of the strips without alteration in thickness) improves the structural qualities of the metal.
   (b) The very high pressure applied to the surface of the blanks in the bowl spreading and end preparation operations produce an extremely hard burnished surface.
   (c) In the embossing operation, the combination of the polished, graded blank, the highly burnished embossing die, and the slow, elastic squeeze of the embossing press (250 to 600 tons) transfers to the surface of the finished piece the high burnish and luster of the embossing die.
5. It reduces the required allowance of scrap metal to less than 10 per cent.
6. It turns out a stiffer and more resilient finished piece.
   (a) Profiling operations increase the tensile strength.
   (b) Reduction of annealings.
7. It reduces the cost of construction of the tool equipment.
8. It gives longer life to the embossing dies.

The complete equipment necessary for the installation of the "Wilzin Process" is now being built for the American market by the E. W. Bliss Company, of Brooklyn, N. Y.

The exclusive rights to the "Wilzin Process" in the United States have been acquired by the Wilzin Process Corporation of 60 Wall street, New York.

An equipment is now being assembled at the Bliss Works in Brooklyn, N. Y., and will soon be ready to demonstrate the Wilzin Process.

A METALLIC PHENOMENON.

The illustration shown below is the result of a peculiar coincidence. The Aeolian Company of Garwood, N. J., were building a large organ and the foreman of the foundry, Fred Knie, received an order to cast some lead weights for the organ. At the completion of his task Mr. Knie, having some metal left over poured it onto the floor. When he took it up the next day he found it had assumed the shape shown. The curious part of the proceeding is the fact that the metal plaque bears a striking resemblance to the man the organ was built for!

A PUZZLE IN LEAD. WHO IS IT?

Who does the plaque resemble?

CYANIDE FACTS.

From the American consul at Glasgow it has been ascertained that the largest individual cyanide factory in the world is located in that city and is now being worked at its full capacity. It is furnishing the requirements of the Transvaal and also makes occasional shipments to the United States. The manager of the company states that since January 1, 1915, the value of the shipments to the United States has amounted to $7,715. The same company has exported in the past to Mexico, but at present that country is not importing. The manager of the company also stated to the consul at Glagow that Great Britain was able to supply all British requirements and to export to other countries.

[The imports of potassium cyanide into the United States in 1913 amounted to 1,008,895 pounds, valued at $143,999, and in 1914 to 1,245,565 pounds, valued at $79,714. Sodium cyanide was not classified separately in the customs statistics previous to July 1, 1914, but for the second half of that year the imports were 2,423,171 pounds, valued at $366,623.]

The total production of cyanides of all kinds in the United States in 1909 (latest census returns) totaled 13,291,080 pounds, valued at $1,941,893.

CONNECTICUT THE BRASS STATE.

Eighty-two per cent. of the brass industry in this country is conducted in Connecticut. From fifty-five to sixty per cent. of the business of the world in this line is conducted in the United States.

EDITORIAL

OLD SERIES
Vol. 21. No. 9.

NEW YORK, SEPTEMBER, 1915.

NEW SERIES
Vol. 13. No. 9.

THE METAL INDUSTRY

With Which Are Incorporated
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER, THE ELECTRO-PLATERS' REVIEW, COPPER AND BRASS.
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FOUNDRYMEN'S CONVENTION

The annual convention of the allied associations of metal men together with the exhibition of the Foundry and Machine Exhibition Company will, as has been announced several times in THE METAL INDUSTRY, be held at Atlantic City, N. J., September 25 to October 2. The associations this year as far as foundrymen are concerned will be only two in number; the American Foundrymen's Association and the American Institute of Metals. The Foundry Foremen's Association, which in former years has met with its sister organizations, has been dissolved and its members have become members of the two associations mentioned above.

The convention city for 1915 is a decided innovation, and the results of its selection by the joint executive committee of the participating societies will be watched with a great deal of interest by all concerned. While there is much to be said in favor of holding the convention in a manufacturing center where opportunities are offered to the visitors to inspect plants of varied interests, yet a convention held in a resort like Atlantic City can do its members a great amount of good by providing healthful diversion between serious sessions. The papers and their discussions and the interesting exhibits shown by the manufacturers at the exhibition offer about all that the average man wants to or is able to absorb during a week's stay. A running view of a strange plant does not leave many indelible pictures on the mind of the observer, and in a few weeks after his return home he has only a jumbled idea of what he has seen. We believe that the coming convention will be most successful and we hope that the results will be sufficient to warrant the selection of Atlantic City as a permanent meeting place.

We publish a brief account of the preparations for the 1915 convention in the opening pages of this issue of THE METAL INDUSTRY. A study of the papers to be presented at the sessions of the American Institute of Metals cannot fail to impress one with the wide field that they cover. Beginning with a comprehensive study of foundry sands, by C. R. Karr, and ending with the conclusion reached by the Bureau of Standards, Washington, D. C., in the investigations relating to the bronzes for engineering work the committee on papers, headed by J. L. Jones as chairman, have certainly done their work well and deserve great praise. All that remains now for the foundry man and the metal worker to do is to read the account, mark the calendar and on September 25 appear in Atlantic City, N. J., ready to take his part in the great event.

CORRESPONDENCE AND DISCUSSION

WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ARTICLES PUBLISHED IN THE METAL INDUSTRY

EFFICIENCY, STANDARDIZATION'S DOUBLE

By Garcia.

To the Editor of The Metal Industry:

At the present time it seems as if standardization was in the limelight in all lines of business, and especially in that of electro-plating. Now, in some cases, standardization is possible, and desirable, where in others it may not be practical; that is, to meet all requirements, such as the universal nickel solution or any other that will give equal results on all lines of work. Efficiency, on the other hand, is possibe and practical, under the present conditions, because efficiency means getting the highest and best of possible results, with given conditions and methods.

At a recent exposition of electro-plating analysis, one of the many visitors, a foreman plater, who had spent quite a number of years at plating, as well as polishing and buffing (a capable man, who also does good work), looking at one of the operators analyzing a solution for the metal it contained, made this remark: "What good is all that stuff, anyhow. That is not what the firm you are working for is paying your salary for. What they want is the work, and they want it fast, as well as cheap and good. Because these fellows can analyze their solutions and tell what is in them, does not say they can go and *throw out the work as fast or as good* as the others, *who cannot analyze their solutions can*, but have worked at the business and know what is wrong, and when, and can fix it up any time. Why, I can take any of my solutions, and I do not care what you put in them, or what is wrong with them. I have worked at the business and know *what to do*, and do it, *and can get as good, if not better work than any of those who can analze their solutions, any day*." There is no doubt that he could do just as he said. *He has had the experience*, and probably has handled, or run up against, any condition that might arise in the past and has something to work on; but it recalls the story of the man who had celebrated his forty-fifth year in his town and own shop, and had always made the proud boast that he had made his "20 per cent. year in and year out during that time." He had this fixed so firmly in his mind that he resented as disloyal his son's attempt (a skilled accountant) to show him that his previous year's business had only paid him 14½ per cent., and that there were years when he had actually lost money. *The son, used to calculating the profits of city concerns, saw at a glance what the father had not seen in forty-five years of business*, in one place.

Now just as a reflection on his own argument, from the different and numerous articles published in the trade papers and books, it has often been stated that in working a brass solution when the work has several different colors, or the work is not plated with a uniform color, that it is an indication (one) that the solution has not sufficient free cyanide and that more is required. Experienced platers have discovered this to be one of the indications, when all else is correct (current, etc.). The plater who does not analyze his solution will dissolve a little cyanide and add what he deems is sufficient, continuing to add more until the work has the proper color (time of value is consumed); in the meantime metal is depositing on the work (which also has value).

The plater who can analyze his solution takes a pipette holding 25 c.c., puts it into a beaker, adds his indicator, and tests it for the amount of free cyanide it contains; makes the proper calculation, then he weighs up the proper amount required *according to his experience*, dissolves it and adds it to the solution; he has just exactly the proper amount required without any waste, and in a minimum of time (probably twenty minutes), he has been able to analyze for the required amount and make the proper addition in, at the most, a half hour, and, with cyanide costing from 22 to 32 cents per pound, he has saved the cost of the analysis many times over, *besides knowing exactly how much the solution contains.*

Now there are other conditions, with which experienced platers are familiar, that would seem to indicate a lack of sufficient free cyanide. The plater who does not analyze his solution (no matter how experienced, it will and has often happened) will conclude that cyanide is required, makes the addition, and finds that conditions are worse than ever; production is held up (more loss), metal is added to neutralize the cyanide (still more loss), and conditions are no better; also, the solution is not conducting properly (owing to the density); some is then thrown away and replaced with water and additions of cyanide. The chances are the solution will *behave* and work properly, and the foreman will still conclude that he was right in his first *guess* that cyanide was required.

There are several conditions that might be confronted here, and among them is one that would prove that the first assumption was correct. It might be possible that the foreman was using sodium cyanide instead of potassium; the consequence would be that he added a larger cyanide equivalent than he needed; the result would be an excess of cyanide, requiring metal to neutralize it, and etc.; probably the cyanide he had was of a known value to him when the case was opened, and it had lost its strength and was of lower percentage than that first used. The result would probably be that as the solution does not seem to respond to cyanide as expected, more metal is added, solution diluted, etc., whereas there might not have been enough active cyanide added in the first place. Conducting salts need not be considered here, as there would naturally be enough in the solution when first made if properly made, or added as impurities with the other additions. (There are many solutions of cyanide giving excellent results without anything but cyanide and carbonate of the metals.) On the other hand, it might be possible that the only *addition required was dilution*, to reduce the density. Or, metal may have been required. These assumptions are, of course, made considering the fact that all other effects, current, etc., are shown to be not affecting the result (by use of measuring instruments, electrical, etc.).

The above is what the plater who does not have to analyze his solutions is liable to get himself into, and that is just the start (but that is how the plater got his *experience* and learned the business). Time lost, also.

On the other hand, the foreman who analyzes his solutions (he also has the experience) will not make these additions to his solution until he has made a determination of just what he requires. His experience will tell him what might be required; therefore, all he has to do is to confirm his suspicions or prove that they are false. He need not bother about the purity of his cyanide; he can get the percentage in a couple of minutes, while he is testing his sample of solution. Making the test for cyanide and finding he has sufficient, he then tests for metals; if he finds them sufficient, then all that is required is water or there is something wrong with the preparation of the work, if the electrical conditions are correct. He can do this easily in an hour.

One of the first elements of *efficiency* is *experience*, and then after this comes the classification of different processes, discarding all but the best and trying all fairly before this is done, and then we finally arrive at the stage called *standardization*, which is the object of *efficiency*, and its final result. To accomplish this several factors are necessary, among them, in electro-plating, the most important are:

FIRST, EXPERIENCE.

There are several elements that are concerned here, among them being a good practical working knowledge of electro-plating acquired by practise, and this is more valuable if the foreman has had practical experience at both polishing and buffing. This does not mean that a good polisher and buffer will always make a good plater, or vice versa; but as the foreman plater has charge of the polishing and plating department (if not, he should)

he is in a position to get the most efficient results. There is little science required in the polishing or buffing of metals, whereas, as we shall see later, it is the heart of electro-plating.

SECOND, A FUNDAMENTAL KNOWLEDGE OF ELECTRICITY.

Especially the laws and a knowledge of the equipment, such as the voltmeter, ammeter, galvanometer, motors, dynamos, and other equipment and measuring instruments, including rheostats and conducting elements.

THIRD, AN ELEMENTAL KNOWLEDGE OF PHYSICS.

This is getting more important right along, and it is part of the new chemistry, or at least a branch of it, called physical chemistry, that is doing a lot to clear up some of the uncertainty of the past.

Last and most important,

CHEMISTRY OR ELECTRO-CHEMISTRY.

By a superficial examination of the above (also from past experience) it would seem that the first requirement would fill the bill and would discount all the rest, because the platers in the past, and also at present, are turning out the work without any knowledge of the rest. You can substitute the first for all the others and get along, but not (efficiently) any one or group of the others for the first. There are quite a number of people who are working at the business (especially those that cannot see the advantage of a chemical knowledge) who have forgotten or never knew that electro-plating was discovered and developed by chemists, and that there has been little real development since the time they left off. The reason for this is the simplicity, apparently, of the operation and the ease with which it is accomplished. And, as can plainly be seen, this is where the *efficiency* comes in; it may be that with an efficient man in charge the running expenses can be cut very deeply. There is a story of a barber who was getting $1.20 a day, and the proprietor one day saw him calculating. When he got through, he said: "I'm going to start a shop. Last Saturday I did $4.80 worth of work. You gave me $1.20 as a consequence. You made $3.60 profit." He forgot that another day he did only 50 cents' worth of work and still got his $1.20. He started his shop, and was a surprised man when after a few months his shop was sold to pay the rent and other costs. It follows then that for *efficiency* that the foreman plater of the present or future will have both the *experience* and *chemistry*, as well as the *electricity* and *physics* required. This future is not far off, and those who have not these things should acquire them as soon as possible, if not, they will be superseded or suffer the indignity of playing second fiddle to one who has.

Electro-plating chemistry does not require the whole study of chemical technology, and is not acquired in a correspondence school, where the cost would be about $180 and at the finish the student would have to work up his own idea after all the time spent. As the study and methods are to be developed by the plater, and nearly all will be new to him, he should accept conditions as he finds them and adapt himself to them. He will be surprised at the simplicity of them once he grasps them, and *simplicity is efficiency*.

The first step in efficiency is the *metric system*. This, of course, requires the decimal system. And what could be more simple or efficient than the interconversion of volume and weight by meants of the decimal in the metric system, and vice versa, and denominations of the same unit?

CUSTOM HOUSE EXPORT REPORTS

THE METAL INDUSTRY, having received numerous inquiries regarding the amount of war material being exported from this country and the seeming absence of registration of same in Custom House Reports, the following letter was sent to the United States Custom Department at Washington, D. C., and an answer to the same is given as below.—ED.

TO THE DIRECTOR:

Sir:—There is considerable matter being published in the daily papers as well as the trade press regarding enormous amounts of material being manufactured in this country presumably for shipment to belligerent countries abroad.

So far Custom House returns do not bear out this statement and we are wondering whether or not these materials are being shipped under names other than what they really are.

If such is the case will not the Custom House returns in the future be rendered erroneous and misleading when statistics are being gathered for tabulation purposes. As for instance, if we wish to find out for certain years how much aluminum material was exported how could we get it if aluminum powder, for instance, had been exported as paint material, without specifying that it was aluminum powder.

Any information that you can give us will be greatly appreciated. THE METAL INDUSTRY.

May 6, 1915.

TO THE EDITOR OF THE METAL INDUSTRY:

Receipt is acknowledged of your letter of May 6 in regard to the unusually large shipments of manufactured material said to have been made from the United States to belligerent countries. In reply the Bureau advises that under the existing system of classification exports of the character in question could not occur without being in some way shown in the official reports, either under specific headings to indicate their nature, such as "explosives," "firearms," "chemicals," etc., etc., or as manufactures of the component material of chief value. In the latter case where specific articles are not named articles are grouped as "all other manufactures of aluminum," "all other manufactures of copper," etc., etc., as the case may be. I thank you very much for the suggestions contained in your letter, and they will be given due consideration in connection with future revisions of our statistical schedules. E. A. BRAND.

Acting Chief of Bureau.

Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C., May 12, 1915.

NEW BOOK

TRANSACTIONS OF THE AMERICAN INSTITUTE OF METALS. Volume 8, 1914. Size 6¼ by 9 inches. 394 pages. Bound in cloth. Edited by the Secretary and published by the American Institute of Metals.

This work covers the activities of the American Institute of Metals for the year 1914, and contains complete reports of the meetings of the institute held in Chicago, Ill., September, 1914, and also the papers read at the various sessions of the society, together with complete stenographical reports of the discussions which attended the reading of each paper.

The book also contains abstracts taken from chemical abstracts published by the American Chemical Society. There is also included a list of the members of the society according to geographical distribution.

The institute is to be congratulated on the very valuable material that has been collected and preserved within this, its latest publication. The matter contained in the volume alone is worth a great many times more than the cost of membership in the institute, and this is aside from the fact that members in the institute have the privilege of submitting their puzzling problems to their fellow members for solution. The book is distributed by the institute and is sent free to members in good standing, but may be obtained by non-members by corresponding with the secretary, W. M. Corse, 106 Morris avenue, Buffalo, N. Y.

JOURNAL OF THE INSTITUTE OF METALS. Volume 13, No. 1, 1915. Size, 6 x 8½ inches. 462 pages, including index. Bound in cloth. Edited by the Secretary, G. Show Scott. Published by the Institute of Metals.

This work contains the account of the annual general meeting of the Institute held at the Institution of Mechanical Engineers, Storey's Gate, Westminster, S. W., London, England, March 18 and 19, 1915. There is also included in the work the reports of the Council and Honorary Treasurer and the election of officers for the coming year.

The balance of the book, covering over four hundred pages, is taken up with a complete report of the papers read at the meeting, together with the discussions which followed the reading of the papers. These papers included the following: "The Effects of Heat and of Work on the Mechanical Properties of Metals," by Professor A. K. Huntington; "The Micro-Chemistry of Corrosion. Part III, The Alloys of Copper and Zinc," by Samuel Whyte; "The Properties of Nickel-Aluminum and Copper-Nickel-Aluminum Alloys," by A. A. Read and R. H. Greaves; "Some Appliances for Metallographic Research," by Walter Rosenhain; "The Constitution of the Alloys of Copper with Tin," by J. L. Haughton; etc.

SHOP PROBLEMS

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE OF THE METAL INDUSTRY. ADDRESS THE METAL INDUSTRY.

ASSOCIATE EDITORS: JESSE L. JONES, Metallurgical PETER W. BLAIR, Mechanical CHARLES H. PROCTOR, Plating

ALLOYING

Q.—Please give us a formula for making a cheap alloy (color no object) for use in making plugs and sockets for howitzer shells. In your opinion could scrap brass, red or yellow, be used with safety, or would additional copper be necessary?

A.—Neither scrap red brass nor scrap yellow brass will answer for making plugs and sockets for howitzer shells owing to the fact that such castings are usually specified to contain less than 0.10 per cent. of lead. The materials you refer to give castings that would easily meet the physical requirements wanted but they would contain possibly 1 per cent. or more of lead.

Manganese bronze castings would meet the lead requirements for these castings, as would pressed brass made from high-grade zinc. Large numbers of sockets are being made from pressed brass while hard rubber substitutes are used in making the plugs.—J. L. J. Problem 2,183.

BRAZING

Q.—Will you kindly furnish the writer with any information you may have relative to brazing of wire of high carbon content (0.70 per cent.). I am not at all interested in anything pertaining to welding but am eager to know of any brazing material that may be used in order to get the highest tensile strength out of the brazed joint. If you know of more than one brazing material that seems to give the same results I would be pleased to have this information so as to try out the brazed joint using any and all materials available. Would a tertiary brass or bronze alloy give a stronger joint than just a 3 to 1 brass?

A.—We believe that you would be able to use manganese bronze with a flux of borax. Also we believe that you can use a fifteen per cent. silver solder for this purpose.—K. Problem 2,184.

COATING

Q.—How can I make plaster of paris waterproof without waxing? Also can gutta percha molds be sprayed with copper bronze powder?

A.—A thin coating of orange shellac dissolved in denatured alcohol will produce a waterproof coating upon plaster of paris without waxing, but the plaster should be thoroughly dry before applying.

Gutta percha molds may be sprayed with copper bronze powder mixed with lacquer. A certain company, whose name we can give you, makes a special collodion lacquer for this purpose.—C. H. P. Problem 2,185.

ELECTRO-ZINCING

Q.—Please give us the formulas for mechanical and still tank electro-zincing.

A.—The following formula for electro-zincing in still and mechanical tanks will give excellent results:

STILL SOLUTION.

Water	1	gallon
Commercial zinc sulphate	1½	pounds
Sulphate of aluminum	4	ounces
Common salt	2	"
Glycerine	½	ounce

MECHANICAL SOLUTION.

Water	1	gallon
Commercial zinc sulphate	2	pounds
Sulphate of aluminum	4	ounces
Common salt	4	"
Glycerine	½	ounce

CYANIDE ZINC SOLUTION—STILL.

Water	1	gallon
Sodium cyanide	5	ounces
Zinc cyanide	8	"
Sodium hydrate	2	"

CYANIDE ZINC SOLUTION-MECHANICAL.

Water	1	gallon
Sodium cyanide	6½	ounces
Zinc cyanide	10	"
Sodium hydrate	3½	"

Cyanide zinc solutions give excellent results and the voltage for still solution should be from 4 to 5 and for mechanical 8 to 10.—C. H. P. Problem 2,186.

ETCHING

Q.—Kindly advise us if you have a formula for making a dip for etching white art glass. What we want is to get away from the old style etching process of placing acid on the glass with the brush. We presume there must be some kind of a dip so that domes or panels can be immersed in the same and etched in that way.

A.—Art glass manufacturers use commercial hydrofluoric acid for etching or producing opaque effects upon art glass. The method is as follows: Prepare a wooden tank of sufficient dimensions for your purpose—the depth should not be more than 8 to 12 inches. Line the tank with asphaltum varnish or with thin sheet lead, the seams of which must be burned in and not soldered. When so prepared have a tight-fitting cover made so that the fumes can be confined. Then add one part acid and one part water. If the etching is too rough, add a small amount of carbonate of ammonia, about one or two ounces per gallon of acid mixture, or reduce the solution with water. The glass may be immersed in the solution by the use of rubber gloves, the number of pieces depending upon the capacity of the tank.—C. H. P. Problem 2,187.

FINISHING

Q.—I would like to inquire if you can tell me how I can produce a dry brush brass finish. What I am after is a finish that is possible to lacquer without a cleaning operation after the finish has been applied.

A.—What is termed the dry brush brass finish is practically a tripoli finish, using a tampico wheel instead of cloth as in a buff. In some instances a brass wire scratch brush, 6 to 8 inches in diameter, is used instead of the tampico wheel. The speed must be not more than five to eight hundred revolutions per minute, otherwise a satin effect is produced. If care is used in applying the tripoli to the brush or wheel to avoid an excess the articles will be comparatively clean. Otherwise it would be necessary to maintain a separate thinner to remove the very small amount of greasy surface on the articles before the regular lacquering. Plain surfaces can also be finished a dry brush brass by using canvas sewed wheels and coating them with 160 to 200 emery which must be fined down with a flint stone or piece of hardened steel before commencing to finish brass. Many concerns have adopted this method, as the surface is left sufficiently clean for lacquering without any further manipulation.—C. H. P. Problem 2,188.

MELTING

Q.—What, in your estimation, is the most satisfactory method for melting German silver and precautions necessary during the melting?

A.—For melting German silver the old style pit furnace seems to hold its own and in the long run will prove to be as satisfactory a method of melting as any I know of. Anthracite coal or coke or a mixture of the two may be used for fuel. A good hot fire is necessary and if heat enough cannot be obtained by natural draft the air space at the bottom of the furnace can be closed up and a jet of air or steam blown into it producing a forced draft.

The inside of the crucible should be painted over with a mixture of wet clay and then allowed to become thoroughly dry; this tends to prevent the absorption of carbon from the crucible. Keep the stirring rod away from the metal until it is ready to be taken from the furnace and during the melting do not try to force the metal by pushing it down into the crucible with a poker but give it time enough to melt down in its own way. German silver which is forced or stirred too much will be more likely to contain blow-holes.

The addition of a small piece of aluminum about as large as the end of your thumb may be added to the mixture for sand castings but if the work is to stand steam, air or water pressure metallic arsenic should be used in the place of the aluminum and, in about the same quantity. The addition of about one-half of one per cent. of metallic manganese in the form of cupro-manganese, added at the time the crucible is put in the furnace, will be found to be beneficial. I have obtained better results with nickel in the form of grain, button or cubes than I have with the shot nickel or the electrolytic or cathode nickel. Borax makes a satisfactory flux, but too much must not be used, four or five lumps about as large as a hickory nut being sufficient. A small covering of charcoal may be added at the time the crucible is stuck in the furnace.

The above also applies to the melting of nickel, with the exception that the manganese content should be raised up to about one per cent. and it should be added in the form of a nickel-manganese alloy. The aluminum may be dispensed with, but the addition of the arsenic will be found beneficial. Do not use any charcoal as a covering when melting pure nickel, but use the borax the same as with German silver. Large melts of German silver and pure nickel do not give as good results as small ones and a No. 60 crucible will be found to hold enough metal for ordinary purposes.

The same methods cannot be used in all casting shops and what gives good results in one shop does not give as good satisfaction in another. This is probably due to the slight differences in the layout and construction of the furnaces as well as the personal equation of the casting crew. Each shop has its own individual characteristics and these have to be taken into consideration in order to obtain the best results—R. A. W. Problem 2,189.

MIXING

Q.—Kindly advise me if you have ever heard of a metal called Marine Glyco.

A.—Glyco metal is a lead base babbitt originally made in Germany. It is an excellent babbitt for general use in bearings and is made in a number of grades which differ chiefly in their tin content. Marine Glyco has the following analysis:

Antimony	16.32
Tin	13.35
Lead	70.18

J. L. J. Problem 2,190.

Q.—Will you kindly answer the following questions? 1. Can spelter be made from scrap zinc? We mean melted into bars or pig form with the old zinc only and no new stock used. 2. Does the solder which is marked half and half contain half lead and half block tin, or what is the proportion of each? 3. Can you give us the shrinkage of the different metals melted up with an up-to-date outfit, such as white and red metals?

A.—1. Excellent spelter can be made from scrap zinc if the proper precautions are taken. The purity of the resulting spelter will depend on the purity of the old zinc. If it contains solder the spelter will be high in lead and tin. Freedom from tin is one of the distinguishing characteristics of Prime Western spelter. In refining scrap zinc if it contains iron, this may be oxidized and removed by boiling the molten zinc with the aid of potatoes or turnips.

2. Solder that is marked half and half, if it is made by a reputable firm, should contain equal parts of block tin and refined lead. A very satisfactory solder may be made from 42 parts of tin and 58 parts of lead, but a lower tin content than this is seldom used except in wiping solders.

3.—No general estimate of the shrinkage of white and red metal can be given. If made from new material, 0.5 per cent. for tin base and 1.5 per cent. for lead base white metals may be considered a fair figure. For red metal such as copper 88, tin 10, and zinc 2 a fair shrinkage would be 1 per cent. If turnings of the various metals is meant, the shrinkage will be much larger as turnings often contain from 3 to 5 per cent. of oil and dirt and the melting losses will be large on account of the very large surface that the turnings offer to oxidation.—J. L. J. Problem 2,191.

PLATING

Q.—We have been experimenting with an acid silver plating solution and as yet have not been entirely successful. We would appreciate any information you can give us as to the proper formula for building up this solution and just how the work should be handled to get the best results in plating reflectors for automobile head lamps.

A.—It is impossible to produce satisfactory results from any form of an acid silver plating solution. Experiments have been made for years to produce such desired results, but always to end in a failure. We are therefore unable to give you any satisfactory data that would enable you to obtain good results.—C. H. P. Problem 2,192.

SOLDERING

Q.—We sometimes have trouble with solder which, in a 40 tin and 60 lead mixture, shows spots on the top side just as the metal solidifies. These spots are not caused by spraying the water, nor do they appear to be the effect of any external cause. The spots appear to be a crystallization of some foreign substance in the solder.

A.—The spots on the top side of bar solder are due to crystallization. They do not appear on other surfaces of the bar because the bottom and sides of the mold convey the heat away from the molten solder so quickly that crystallization is prevented. By using pure tin and lead and water-cooling these spots may be avoided.—J. L. J. Problem 2,193.

TINNING

Q.—We have a hot tin bath (straights tin) used for tinning both brass, copper and iron. After being in use for some time it apparently absorbs some zinc probably from the brass. Can you advise a method of purifying this tin, that is removing the zinc?

A.—We do not believe that you have any zinc in your tinning bath, as it would be very unusual for the tin to absorb any zinc from the brass.

What we think is the matter with your tinning bath is that you have some sponge tin which has been formed due to oxidation and which has settled to the bottom of your tinning kettle. The hard or dross tin which is found in the bottom of the tin tank should be removed from time to time by the means of a ladle made of perforated metal and allow the pure molten tin to drip from the lump of dross. This dross may be accumulated until you have a sufficient quantity and then can be sold for the tin content and is worth fifty per cent. or more of the price of pure tin. On the other hand, if conditions are favorable, this dross material may be re-melted and purified on your own premises.—K. Problem 2,194.

PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY

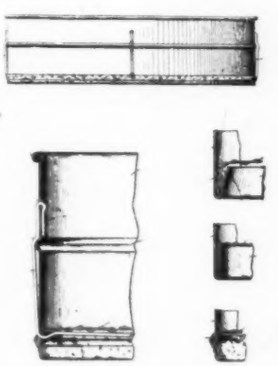
1,146,185. July 13, 1915. **Aluminum Alloy.** W. A. McAdams, Bay Shore, N. Y.

This invention relates to an aluminum alloy particularly adapted to casting purposes and consisting of aluminum, silver, copper and cadmium. These parts are combined substantially in the proportions of aluminum eighty-two parts by weight, silver one part, copper twelve parts and cadmium five parts.

In forming the alloy, the aluminum is first melted together, then added and the two melted together, then the silver is added, then the temperature is lowered as low as it can be and yet remain sufficiently high to melt the cadmium when the latter is introduced, and the mixture is thoroughly stirred and then poured into molds to form the article to be cast, or into molds to form ingots for shipment for further use.

1,147,858. July 27, 1915. **Foundry Riddle.** M. F. Gleason, Palmer, Mass. Assignor to Wright Wire Company, Worcester, Mass.

The present invention relates to foundry riddles, or sieves, which are employed to riddle the sand used in the making of molds.



An object of the invention is to provide a durable and inexpensive device of the class specified, which is capable of easy manufacture.

A further object consists in the production of a riddle, as shown in cut, in which the mesh is firmly and rigidly secured in the wall thereof by means which grip the wires of the mesh, and are conformable to the interstices between said wires.

The inventor claims: In a foundry riddle, a mesh disk having a depending edge, a cylindrical wall surrounding said disk and having a portion folded inwardly upon said wall to inclose said depending edge between it and said wall, with a projecting bead formed simultaneously in said wall, folded portion, and inclosed disk edge, near the free end of said folded portion, whereby the edge of said bead in said folded portion serves to draw the mesh disk taut.

1,147,718. July 27, 1915. **Process of Plating Aluminum.**

This invention relates to improvements in processes of plating aluminum, and the object of my improvement is to produce a process of plating that is commercially practicable; that can be applied to the plating of aluminum with brass, copper, silver, and nickel, and that furthermore can be applied to the plating of commercial aluminum, such as is found in use in ordinary arts and manufactures.

In carrying out the process the inventor first treats the surface of the aluminum to be plated to a preliminary cleansing operation, which consists in washing first with benzine and then in a solution of caustic soda. This preliminary cleansing operation is ordinary, and serves to remove grease and foreign matter that may be adhering to the surface.

The preliminary cleansing operation or step described is followed by a special cleansing step, in which the material is dipped in a bright dip made up of 2 parts of nitric acid and 1 part of oil of vitriol and rinsed. The purpose of the bright dip treatment is to remove from the surface all metallic particles other than aluminum.

After the two cleansing stages described the material is subjected to the first step in the plating process proper, and which consists in plating the surface with zinc by the electro-deposition process. For this purpose the inventor prefers to use a strictly zinc solution, though in some cases a brass solution may be used that is high in zinc. In case a brass solution is used for this stage the brass should be so high in zinc as to show no brass color.

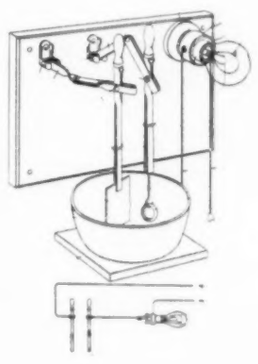
The zinc plating sufficient for his purpose, and which is to coat the surface with a thin film of zinc, he finds to be readily effected in a few seconds.

After the zinc plating described the surface is ready for the regular solution for plating with such materials as brass, copper and silver, and in applying the said materials in most cases the plating will be continued for a few hours. In case of plating with nickel, however, he finds that the direct plating of nickel on the zinc to be inoperative, as the solution has acid qualities, so that the same would attack the surface of the zinc injuriously.

He finds that plating with nickel can be successfully effected by first coating the material with a plated coating of copper, involving, however, a treatment in the copper solution of only 20 to 30 minutes, instead of the usual 2 or 3 hours that is required to obtain a finished coating of copper. After the surface has been coated with copper in the manner described the nickel plating is applied essentially in an ordinary manner.

1,148,272. July 27, 1915. **Electroplating Apparatus.** Hugo Aderer, of Bloomfield, N. J., assignor to J. F. Jelenko & Co., a copartnership composed of Jesse F. Jelenko and Hugo Aderer, of New York, N. Y.

This invention relates to electro-plating apparatus particularly adapted for use in plating a variety of articles of different shapes and sizes.

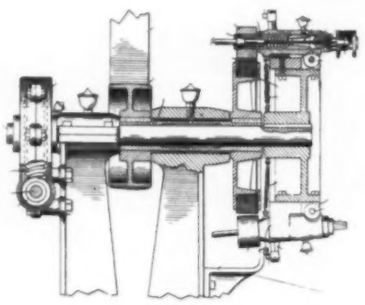


In plating a single shape and size of article, the proper plating current and electrode distance is determinable by calculation and experiment once and for all, but in plating various sizes of articles of different shapes the apparatus must be capable of ready adjustment to meet the varying kinds of work. In dental and jewelers' work where much gold plating is done, the conditions vary with each piece of work and it is important to provide an easy and ready control of the voltage and electrode distance and to do this with a minimum of time and attention on the part of the operator.

It is an object of this invention to provide such an electroplating apparatus, as shown in cut, by providing adjustable electrode supports in series with a lamp rheostat, the resistance setting of which may be observed from the glow of the filaments at a glance. The electrode arms are made adjustable to vary the relative position of the electrodes and the distance between them and consequently the resistance of the electrolyte and the rate and character of the metal deposit, and it is possible to observe the amount and character of this adjustment by the varying glow of the lamp filaments in series with the electrodes.

1,148,768. August 3, 1915. **Polishing Machine.** J. F. Gail, Kenosha, Wis.

This invention relates to improvements in polishing machines in general, and particularly to a type of polishing machine employing as an abrading member a flexible band coated with abradant material.



Among the salient objects of the invention are, to provide a machine, as shown in cut, in which a succession of objects to be polished are carried into the field of a relatively stationary flexible band having an abrasive surface; to provide a machine of the type referred to in which the objects to be polished are mounted upon a continuously moving carrier which carries the objects successively into the field of an abrasive band arranged longitudinally of the direction of travel of the parts and to provide in a machine of the class described improved means of rotating the parts while in the field of the polishing member.

1,148,814. August 3, 1915. **Metallurgy of Copper.** L. Addicks, Perth Amboy, and C. L. Brown, of Chrome, N. J.

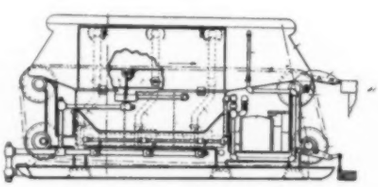
This invention relates to the metallurgy of copper, that is to say, to the refining of copper and to the melting of copper.

One of the principal claims covered by this patent is: The refining of nearly pure copper by simple melting under mildly oxidizing conditions and in the presence of only sufficient acid material to slag off the small proportion of impurities contained while minimizing the formation of slag by avoiding contact with acid material, covering the molten charge with a protecting layer of carbonaceous material of minimum ash content, firing in such manner as to prevent ash coming in contact with the charge, and subsequently poling out the small proportion of cuprous oxid incidentally formed.

1,150,101. August 17, 1915. **Method for Cleaning Articles.** Elbert L. Couch, of Hartford, Conn., assignor to Couch-Dean Corporation, of Hartford, Conn., a corporation of Connecticut.

This invention relates to a method of cleaning articles. The articles may be of various characters, for instance, metal, china or porcelain, these being three of many illustrations.

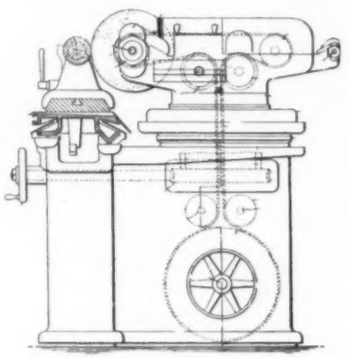
One of the primary objects of the invention is the provision of a method by which said articles can be effectually, thoroughly and rapidly cleaned. The method involves as to one of its features the movement of the article or articles and the subjection of the same to electrolysis, by virtue of which rapidity in operation is insured. The inventor says: "I prefer that the electrolytic treatment occur during or simultaneously with the travel of the article or articles, as in this manner the action is further hastened. I have found in practice that by my method I can completely remove tarnish, stains and adhering foreign matter from silverware and other metals, which is a matter of considerable importance. I prefer that the articles be put upon a carrier, as shown in cut, which is of such kind as to cause movement bodily of the articles. It is conceivable, of course, that such movement might be a gravitative one, but the best results are obtained by actuating the carrier, which may consist of a belt or drum—merely two of several samples. The article-supporting surface or portion of the carrier may be of tin, aluminum, a composition of metals or otherwise made electrolytically active, excellent results having been secured by utilizing tin for this purpose, although, as will be inferred, the invention is not limited in this and other particulars. The article or articles constitute an electrode. The electrolyte consists of a suitable solution, known as 'Silver Ease,' sprayed onto or otherwise suitably applied to the articles."



1,150,222. August 17, 1915. **Grinding Machine.** Charles H. Norton, of Worcester, Mass., assignor to Norton Grinding Company, of Worcester, Mass., a corporation of Massachusetts.

This invention relates to a grinding machine and particularly to a type of machine in which the grinding wheel is driven from below the grinding head.

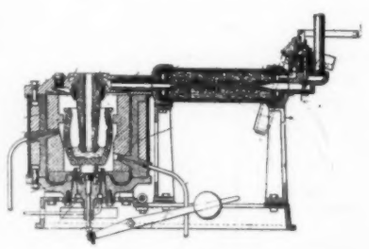
It is the usual practice in universal grinding machines to support the grinding wheel upon a wheel head which is angularly adjustable upon a wheel slide. The wheel slide is mounted for longitudinal movement upon a slide base, which, in turn, is angularly adjustable upon the frame of the machine.



It is one of the objects of this invention to provide a construction, in a grinding machine of this type, in which the connections for driving the grinding wheel are brought from below to the wheel head along a path substantially coincident with the vertical axis about which the side base is angularly adjustable. In a preferred form of the invention, as shown in cut, the wheel is belt driven and the belt is guided by idle pulleys to travel in parallel runs to and from the wheel shaft, the line of each run being closely adjacent to the axis above mentioned.

1,150,318. August 17, 1915. **Casting Metals.** Samuel Price Wetherill, Jr., of Philadelphia, Pa., assignor to Wetherill Finished Castings Company, of Philadelphia, Pa., a corporation of Pennsylvania.

This invention relates to certain new and useful improvements in metal casting furnaces and is particularly designed to provide a furnace applicable not only to the casting of metals of relatively low fusibility, such, for instance, as tin, lead, zinc and their alloys, but particularly to the casting of metals of relatively high melting points, such as aluminum, brass and the like.



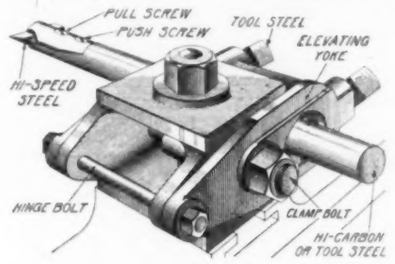
In carrying out the invention, there is provided an internally heated pressure chamber, as shown in cut, within which the metal to be cast is contained, which metal is kept at the high temperature necessary for casting by means of the heat supplied to the interior of the chamber. In some instances, the melting pot or container for the metal to be cast constitutes the lining of the furnace chamber, and, in other instances, the melting pot or container is a separate crucible located freely within the interior of the chamber, in such manner as to be exposed both within and without to the pressure prevailing therein. By means of this latter expedient the pressure of the aeriform fluid upon the interior walls of the container or inner crucible is counterbalanced by the pressure exerted upon its exterior walls, thereby correspondingly relieving it of unequal strains.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

RIGID BORING TOOL SYSTEM

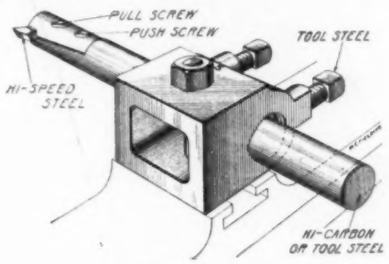
The boring tools illustrated here, and other small tools, recently placed on the market by The Rigid Tool Holder Company, of Baltimore, Md., were designed and originally made by a mechanic in the U. S. Bureau of Engraving and Printing, in Washington, D. C., for his own use. They proved good, and the shops of all the government departments of Washington, so it is claimed,



ADJUSTABLE.

have either given or promised an order for one or more of them. The tools consist mainly of a special lathe boring bar, in ten sizes; four types of holders therefor, to meet various conditions; a special cutting off tool; and internal and external thread tools.

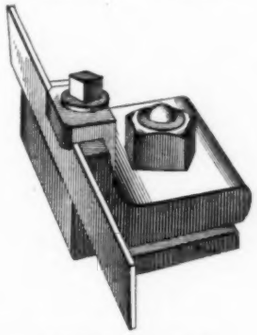
The boring bar's cutter clamp's power is multiplied five and a half times by the action of the push screw. Yet the normal ex-



SINGLE REVERSIBLE.

terior of the bar is not materially altered by the clamping mechanism; it requires no special wrench; cutter can not screw up and dig in in boring or unscrew and loosen in turning, and there are no detached parts to get lost.

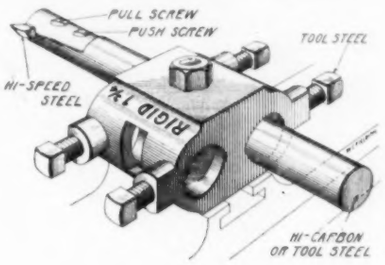
The adjustable boring tool fits most any lathe from 12 inches up. It has a broad square base; generous heft and marked



CUTTING-OFF TOOL.

ridigity. Its hinged elevating yoke, which carries the bar, is locked by the clamp nut, at any exact elevation. All the barports are elongated horizontally.

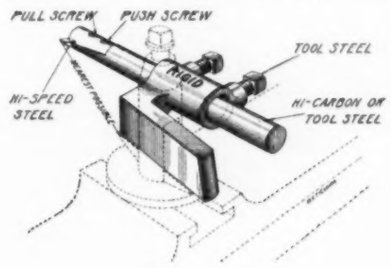
The double reversible boring tool has a one-piece steel holder and is as rigid as an anvil. It reverses both end for end and upside down, giving four bar elevations from 1⅜ inch to 1¾ inch, progressing by eighths. A ½ inch liner, furnished, makes it practically universal. The single reversible boring tool has another one piece holder as rigid as possible and intended for two specified lathes only to which it is fitted. It reverses vertically only. The tool post boring tool has still another one-piece holder and is as rigid as a tool post tool can be. The angular opening between the shank and barrel brings the strain receiving



DOUBLE REVERSIBLE.

cutter point "nearest possible" to the supporting tool post wedge. The angularity of the opening also throws the cutter point directly in front of the said wedge. The bar has a solid bearing at each end of the long barrel and it takes bars of all sizes up to its limit.

The cutting-off tool is obviously very rigid. It is either right



TOOL POST.

or left handed. It always sits level; holds its blade up straight; has a long off-set reach, and it is an ideal heavy duty tool. Its ability to cut off tool steel under automatic cross feed is claimed. U-shaped liners are used for elevating.

ELECTRIC FURNACE EXHIBITION

Interest in electric furnaces will reach a high point at the Foundry & Machine Exhibit at Atlantic City, September 25 to October 1. A Snyder electric furnace will be in commercial operation, melting cold scrap and pouring three times each day, at 11 A. M., 2 P. M. and 5 P. M. The major part of the Snyder Electric Furnace Company's booth will be given over to molding and pouring floor. The finished castings will be cleaned by auxiliary apparatus in nearby booths, and some of each day's output will be machined in the hall. Tests will be made at Philadelphia of castings from each heat, and the results will be announced the following day. Each heat will be taken off under the direction of some prominent foundryman.

The Snyder electric furnace to be shown is of a regular commercial type and size, 1-ton holding capacity, and 10-ton capacity per 24 hours. It is expected that the furnace will be disposed of at the exhibition. The Snyder Electric Furnace Company, 53

West Jackson Boulevard, Chicago, Ill., design electric furnaces for melting all metals, for melting all ores, and for various descriptions of heat treatment and chemical work.

POLISHING MACHINES

The cut shows the metal polishing machine manufactured by the St. Louis Machine Tool Company, manufacturers of polishing and grinding machines, St. Louis, Mo. These machines are the same in design, workmanship and finish as the St. Louis grinders which are already so well known to the trade and they have the same type of bearing and are designed by the makers to be the most efficient babbitt-bearing machines that it is possible to build. The specifications for the various sizes of these machines as manufactured are as follows:

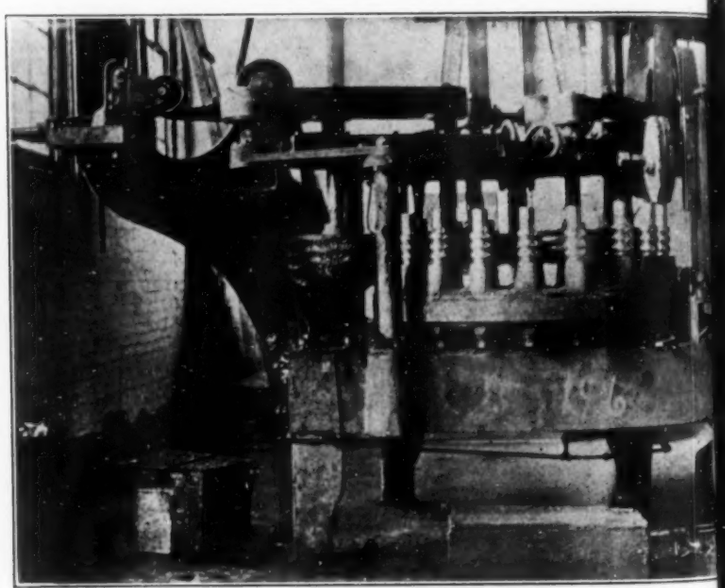
METAL POLISHING MACHINE MADE BY ST. LOUIS MACHINE TOOL COMPANY, ST. LOUIS, MO.

SPECIFICATIONS.

Machine	No. 1.	No. 2.	No. 3.	No. 4.
Diameter of arbor in collars, inches	5/8	3/4	7/8	1
Diameter of arbor in bearings, inches	3/4	7/8	1 1/16	1 3/16
Length of arbor, inches	27	30	33	36
Distance between wheels, inches	22	24	27	29
Length of bearings, inches	3	3½	4¼	4¾
Height to center of arbor, on bench, inches	6	8	10	12
Height to center of arbor, on column, inches	42	42	42	42
Size of base of head, inches	4 x 8	4½x 9	6 x10½	6½x14
Size of base of column, inches	10 x14	11 x15½	12 x16	13½x17½
Size pulley, inches	2½x 2½	3 x 3	3½x 3½	4 x 4
Size C. S. drive pulley, inches	12 x 2½	12 x 3	12 x 3½	12 x 4
Size C. S. T. & L. pulley, inches	4 x 3	6 x 3	6 x 3½	6 x 4
Drop of countershaft, inches	6	6	6	8
Size of shaft, inches	22 x 1 1/16	24 x 1 1/16	24 x 1 1/16	26 x 1 3/16
Weight of head, pounds	22	33	52	75
Weight of column, pounds	65	85	90	105
Weight of countershaft, pounds	50	55	60	70
Weight complete, pounds	137	173	202	250

RICHARDS POLISHING MACHINE

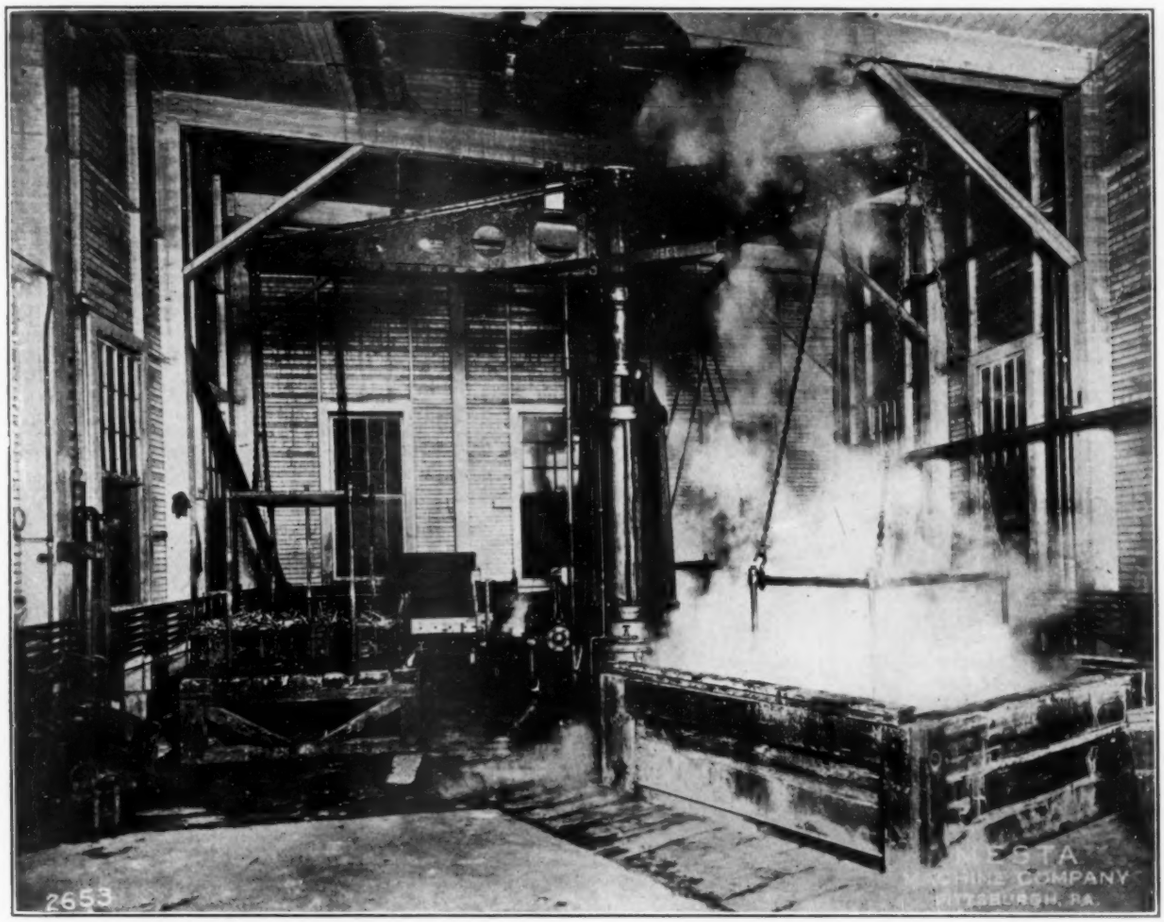
The machine shown in the cut has been invented and patented by F. W. Richards, of Connecticut (United States Patent 1,139,371, May 11, 1915, noted in THE METAL INDUSTRY, June, 1915), for the purpose of buffing a large variety of brass work, as, for instance, drawn shells and tubes of various sorts, as well as cast brass pieces of all kinds. The machine is a distinct innovation in its way and is destined to work a revolution in automatic buffing machinery. Mr. Richards states that the machine will buff, cut and color flat work, such as strainers; round work, all kinds of bedstead trimmings, can be cut and colored in one operation. Oblong and cup work, such as oblong talcum powder tops, also square work of all kinds. All this work mentioned above is done in great quantities, as much as 20,000 pieces per day with one operator. It should be understood that this work is not merely "cut down," but it is also colored, ready for nickeling or lacquering. The cost is only 80 cents per thousand to cut and color or to cut and "old brass" finish canopy shells and alarm clock cases can be handled in large quantities at a correspondingly low cost. Mr. Richards makes this point very strong: The work done on this machine does not have to be colored afterwards; it is finished complete when it leaves the machine. Further information regarding this machine may be had by addressing THE METAL INDUSTRY, 99 John street, New York.



RICHARDS POLISHING MACHINE.

MESTA PICKLING MACHINES

The Mesta Machine Company, Pittsburgh, Pa., have just shipped a four-arm low type sheet pickling machine, as shown in cut, to the Alan Wood, Iron & Steel Company, Philadelphia, Pa. This machine is of the improved type, with the balancing cylinder. Another four-arm low type machine has recently been shipped to one of the largest arms manufacturing companies in the United States. It is to be used for pickling rifle barrels, gun parts, and small castings, and is the second unit of the type furnished to this company within the last year. It is said that the machine is pickling as much material in 15 minutes as could be pickled by the old method in from 3 to 5 hours. Furthermore, the material is much more thoroughly cleaned, thus eliminating the necessity of the sand blast previously required to insure a clean product. Two machines of the standard low type are now being built for the Standard Tin Plate Company, Canonsburg, Pa., who have had two Mesta pickling units in operation for years. When these new units are installed this company will have a total of six Mesta pickling machines in their plant, three having been in operation for several years. The steady demand and the continuance of repeat orders for this machine prove that its use gives better results than any other method of pickling, as the material is pickled in a shorter time and with less labor. Furthermore, a more thoroughly pickled product is obtained. Hundreds of these machines are now in operation throughout the United States, pickling sheets, pipe, strip steel, gun parts, automobile parts, wire coils, castings and various other products of iron, steel, brass and copper.

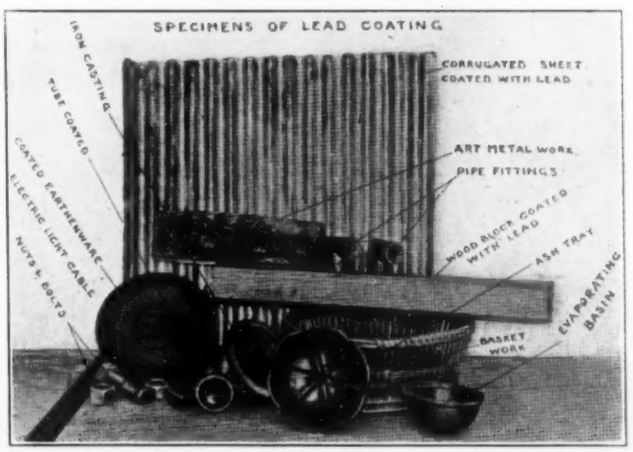


THE MESTA PICKLING MACHINE. NOTE THE POWERFULLY B UILT MACHINE FOR EASILY HANDLING THE PRODUCT.

LEADISING

Lead, Limited, 1 and 2 Old Pye street, Westminster, London, England, are now applying, for the trade, their new process which they term Leadising, and which enables brass, copper and other metals to be coated with lead to any desired thickness up to one-sixteenth of an inch or more, and it is claimed to be suitable for protecting metals from corrosion and the lining of pipes, tubes and chemical vessels for containing and conveying corrosive liquors.

Leadising can also be applied to the coating of earthenware and wood, and for the protection of ornamental iron work. The illustration shows some of the applications of this new process. Leadising is said to be rapid and the cost is low and for an equal weight of metal, it is cheaper than hot galvanizing or terne plates. Samples of Leadising may be seen at the office of THE METAL INDUSTRY.



SAMPLES OF LEAD COATING DONE BY LEAD LIMITED, WEST MINSTER, LONDON, ENGLAND.

ASSOCIATIONS AND SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE METAL INDUSTRY ORGANIZATIONS.

EXHIBITION OF CHEMICAL INDUSTRIES

When America's first National Exposition of Chemical Industries opens its door at the Grand Central Palace, New York, N. Y., on Monday, September 20, it will mark an epoch in the achievements of chemical industry in America. It will be an event in the history of the industries dependent on chemistry, and cannot fail to be far reaching in its results. It will bring into closer contact than ever before, the manufacturers, financiers, dealers and consumers. Elaborate exhibits are arranged, many of them working units, giving visitors the opportunity of seeing for the first time the processes or apparatus in actual work. The public will be given their first initiation into the "mysteries" of chemical industry.

It is expected that President Wilson will be present and participate in the opening of the exposition. An invitation from the Advisory Committee, composed of the following well-known chemists and chemical engineers, has been sent to him: Raymond F. Bacon, Charles H. Herty, Henry B. Faber, A. D. Little, R. P. Perry, William Cooper Procter, E. F. Roeber, George D. Rosengarten, T. B. Wagner and Utley Wedge. Among the institutions who have co-operated to make this exposition a success are the American Chemical Society, the American Electrochemical Society, the American Institute of Mining Engineers, the American Institute of Electrical Engineers, American Pulp and Paper Association's Technical Section and the Bureau of Commercial Economics.

AMERICAN ELECTRO-PLATERS' SOCIETY

(AN EDUCATIONAL SOCIETY.)

President, W. S. Barrows, Toronto, Canada; Secretary-Treasurer, Walter Fraine, 507 Grand Ave., Dayton, Ohio. All Correspondence should be addressed to the Secretary. The objects of this society are to promote the dissemination of knowledge concerning the art of electro-deposition of metals in all its branches. The Society meets in convention in the spring of each year, subject to the decision of the executive committee. The next convention will be held at Toronto, Canada. The branch associations hold monthly and semi-monthly meetings in their various cities.

New York Branch—H. H. Reama, president and William Fischer, secretary, 345 East 23rd street, New York.

The monthly meeting of this branch was held at its rooms in the Arcade building, Fulton and Pearl streets, on Friday evening, August 27, at which time Emile N. Pintner, of College Point, N. Y., was elected to active membership. The laboratory committee is making preparations for the coming winter, when standard solutions and analysis of same will be made.

Newark Branch—Edward W. T. Faint, president, and George Reuter, Jr., secretary, 175 South 11th street, Newark, N. J.

This branch held its regular monthly meeting at 40 Bank street, Newark, N. J., on Friday, August 27, when Samuel R. Taylor read a paper on "The Electrodeposition of Gold," which dwelt on the various reagents used in depositing by electrolytic methods.

St. Louis Branch—H. H. Williams, president, and Frank C. Rushton, secretary, 4405 Blair street, St. Louis, Mo.

The regular monthly meeting of this branch was held at Belleville, Ill., where the members were entertained by Belleville members. A very interesting and detailed talk was given by Mr. Robins on the advantage of single nickel salts over double nickel salts.

Toronto Branch, W. J. Salmon, president, and Ernest Coles, P. O. Box 5, Coleman, Ont, Canada, secretary.

The regular monthly meeting of the Toronto Branch was held in Occident Hall on Thursday, August 26, with President Salmon. After the regular business had been disposed of a general discussion of "Tin Plating" was had and which proved to be very interesting.

AMERICAN FOUNDRYMEN'S ASSOCIATION

Secretary Backert announces that the headquarters of the association during the week of its convention at Atlantic City, N. J., September 28 to October 1, have been established at the Hotel Traymore in place of the Marlborough-Blenheim, as was previously announced.

He advises that it is best to reserve hotel accommodations as far in advance as possible either by mail or telegraph before leaving for the convention. Mr. Backert's advice to visitors to the convention upon arriving at Atlantic City is to proceed at once to hotel, secure accommodations and then go at once to place of registration and register.

AMERICAN ELECTROCHEMICAL SOCIETY

The September meeting of the American Electrochemical Society will be held in San Francisco, Cal., from Thursday, September 16, to Saturday, September 18. Special transportation facilities have been arranged for by a committee of which J. M. Muir, 239 West Thirty-ninth street, New York, is chairman. Various routings are offered and full particulars can be obtained by addressing Mr. Muir. The regular society train will leave New York on Saturday, September 11, and the special engineers' train on Thursday, September 9. At the time of holding the meetings, the American Institute of Mining Engineers and the American Institute of Electrical Engineers will also be in session, and joint meetings have been arranged with these societies for Friday, September 17. During the following week the International Engineering Congress will hold its meetings.

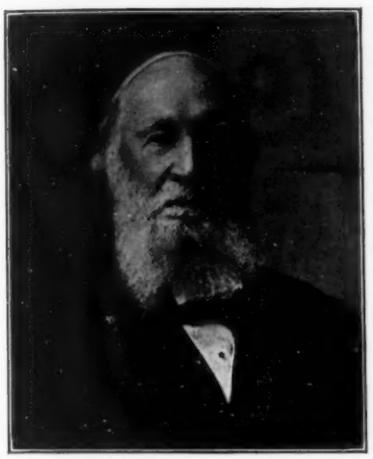
INSTITUTE OF METALS

The following is a list of the papers that are expected to be submitted at the meeting of the Institute of Metals, to be held at The Chemical Society, Burlington House, Piccadilly, west, England, on Friday, September 17, 1915, commencing at 8 p. m.: 1. "The Corrosion of Gun Metal," by Dr. C. H. Desch. 2. "Metallic Crystal Twinning by Direct Mechanical Strain," by Professor C. A. Edwards, D. Sc. 3. "Notes on the Copper-Rich Kalchoids," by Professor Brinton and Professor S. L. Hoyt. 4. "The Constitution of Brasses Containing Small Percentages of Tin—a Contribution to the Study of the Termany System, Copper-Zinc-Tin," by Dr. O. F. Hudson and Mr. R. M. Jones, MSc. 5. (a) "Structural Changes in Industrial Brasses"; (b) "Hardness of Copper-Zinc Alloys," by Dr. D. Meneghini. 6. "Specifications for Alloys for High Speed Superheat Steam Turbine Blading," by Mr. W. B. Parker. 7. "The Physical Properties of Metals as Functions of Each Other," by Mr. A. H. Stuart, D.Sc. 8. "Detection of Internal Blowholes in Metal Castings by Means of X-Rays," by Mr. C. H. Tonamy.

PERSONALS

ITEMS OF INTEREST TO THE INDIVIDUAL.

DAVID N. CAMP.



DAVID N. CAMP.

David N. Camp, fondly known throughout Connecticut as New Britain's grand old man, stopped forever from active work in the manufacturing field on August 2, when he resigned the presidency of the Skinner Chuck Company, a position he had held since the concern was organized in 1888. Mr. Camp is now in his ninety-fifth year. Last winter he was ill with double pneumonia, but his iron constitution stood him in good stead and he survived. Although he has since regained his health, he has long felt that the burden of leadership should rest on younger shoulders. Up to last winter Mr. Camp attended regularly to his duties at the office, but since his illness he had been able to make only weekly visits to the factory.

L. Klein has become connected with the Eisemann Magneto Company of Brooklyn, N. Y., in the capacity of foreman plater.

Royal F. Clark, formerly connected with the Eagle Glass and Manufacturing Company, Wellsburg, W. Va., as foreman of their plating and buffing departments, is now in charge of the gold and nickel plating departments of the Acme Shear Company, the largest shear manufacturers in the world, Bridgeport, Conn.

R. A. Wood, the well-known brass mill superintendent, formerly connected with the New Jersey Tube Company, Harrison, N. J., has been appointed superintendent of the Stamford Rolling Mills Company at Stamford, Conn. This company is the reorganization of the Stamford German Silver Company, and is being rapidly equipped to turn out brass, and other copper alloys, as well as German silver, for which metal it was originally designed.

Mr. Wood is also the author of a very interesting work called the "Waterbury Book of Alloys," which represents the result of twenty years or more experience in the manufacture of copper and its alloys, presented in the form of practical data. The work is published in loose-leaf form, the idea being that additional sheets of data and valuable information may be added to it from time to time. The book is sold by Mr. Wood by subscription only, the subscription representing an agreement entered into by Mr. Wood and subscribers to furnish them with practical information relating to the metal business.

DEATH

Joseph Rademaker, formerly president of the American Brass Foundry Company, Louisville, Ky., and a brother of J. W. Rademaker, of the Independent Brass Foundry, died recently of strangulation following an attempt to swallow some food while in a weakened condition brought about by illness. Mr. Rademaker had been suffering from a nervous collapse and had been in very poor health for several months.

TRADE NEWS

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS AND TRADE ITEMS OF INTEREST FROM THE DIFFERENT INDUSTRIAL CENTERS OF THE WORLD.

WATERBURY, CONN.

SEPTEMBER 7, 1915.

Prosperity exists in the brass and kindred metal industries of this part of the country, and it is the kind that spells good times, good business and conditions helpful to other industries and to retail trade, but it is menaced at this writing by the strike monster. The International Machinists' Association has organizers at work here and apparently they are meeting with much success. Joseph Ettor, the Industrial Workers of the World agitator, also is here, and the two labor organizations, or perhaps the better term is, "organization of wage earners," are competing for membership. At present the International is enlisting only the skilled men and the I. W. W. is seeking membership among the unskilled workers. Thus there appears to be a three-cornered struggle taking form. All employes want more pay and allege that the manufacturers are getting immense profits out of orders for war munitions and should divide with them. The unskilled organizers contend that the laborers are as much entitled to special consideration at this time as are the skilled men, and with skilled and unskilled men organizing to demand more pay and the eight-hour day the manufacturers may have their hands full during September.

The Scovill Manufacturing Company already has taken steps to forestall trouble. Announcement was made August 26 that the company would grant the employees in all departments working on a ten-hour schedule, Saturday afternoons off. To offset any loss of wages through this reduction of time, the company raised the pay for piece work ten per cent., and for time work ten per cent. It appears that this announcement did little to modify the radicals. They claim they do not want the half-holiday and they do want the ten hours' pay for an eight-hour day.

One interesting complication has arisen in the past few days. The Remington Arms Company of Philadelphia sent a representative here to enlist machinists and toolmakers to go to the Philadelphia plant to work.

At the plants of the Chase Rolling Mills Company, the Waterbury Manufacturing Company and the Farrel Foundry and Machine Company there is agitation similar to that at the Scovill plant, but the forces of the agitators appear to be concentrated against the Scovill organization.

Business on the whole is better than it has been in any previous month this year. It is not yet at high tide, nor does the time for high tide seem near at hand, but there is a noticeable increase in orders of domestic origin and for domestic consumption. There also is some slight evidence of activity towards securing business in South America. At the Scovill plant there is more business in domestic lines, such as silver and brass novelties, copper and steel products, not including materials for war munitions than there has been for some months, and this has tended to at-

tract some of the skilled help from other Naugatuck valley factories here. These hands have found this plant equipped with more advanced machinery and apparatus than those they have been familiar with, the oil furnaces for the casting shops especially. In the new casting shops which have been started during the past year, and in those which are still under construction this system replaces the coal and wood heating system. Workers appear to like it better and seem better able to stand the heat. The eight-hour schedule prevails to a considerable extent in these shops.

Foundries, such as the Manufacturers Foundry Company, the Waterbury Foundry Company and the foundry shops of some of the large manufacturing houses are busy and have plenty of orders ahead. Machinery orders still come in quantities and great activity prevails in the E. J. Manville Company, the Rowbottom Machine Company, Inc., and the Waterbury Farrel Foundry & Machine Company shops. The shops of the pin companies are running busily and the screw and specialty lines appear active. The Blake & Johnson Company's and the Berbecker and Rowland Company's plants are active. The American Pin Company and the Oakville Company keep busy, and the numerous small shops about the city are running full time with not full payrolls. The Novelty Manufacturing Company, the Mattatuck Manufacturing Company and the Rogers & Brother plant all have plenty of business, but no occasion to turn down orders.

Reports that the Waterbury Manufacturing Company had been compelled by rush of business to refuse orders were officially denied during the past week, and, indeed, while there may be large orders ahead in several offices there is no indication of a permanent restoration of prosperous conditions for an indefinite period. Conservatism prevails among the buyers and it is very probable that the present activity and the recent influx of orders for brass goods is due more to the state of mind created in the market by the rise of brass and spelter in price than to a great increase in sales to consumers. It seems to be the impression among the wage earners hereabouts that it is better to save than to spend and they are piling up money in the savings banks.

The various departments of the American Brass Company continue busy. The Benedict & Burnham branch is still growing in size and in number of employees. The west end mill (Waterbury Brass Company) is soon to be enlarged by the addition of a rod mill. The new casting plant which is under construction in Torrington has been pressed into service and all of it that is available has been put into operation. It will continue to add to its working force as rapidly as the contractors complete each portion.

Watch business has taken a new activity in the past few days. The Ingersoll plant (formerly the New England Watch Company); is operating with increasing forces. The Waterbury Clock Company's watch department, which makes Ingersolls, has resumed its old activity and has taken in many hands that were employed in the clock department, that are not active. There is no special reason assigned for this change, but there is an impression abroad that the Ingersoll sales forces have begun to make promising headway in the South American field.

Labor prices are high. The Italian reservists have been withdrawing from here by the hundreds for weeks and the stragglers are going now. Six months ago raw labor was to be had for $1.75 a day. Today the price is $2 and $2.25, and few looking for work.

If there is no labor disturbance the prospects are favorable for prosperous conditions hereabouts for some time, probably five or six years, but if there should be a strike, and such disturbances as Bridgeport is experiencing, Waterbury will probably see much of its business snatched from it and given over to some of the brass industrial centers in the Middle West, a result that would be costly alike to manufacturers and employees, and which would doubtless set the city back for years, as did its last machinists' strike. It would be well, it seems, for both employers and employees to get together, have a mutual exchange of grievances (there are some long-standing complaints on both sides), find a fair working medium to handle these problems, and make a new start. At the close of the European war, the communities where capital and labor are on the best terms will be best able to meet the new problems and the new opportunities which are bound to have serious effect on all industrial enterprises in this country.—F. B. F.

BRIDGEPORT, CONN.

SEPTEMBER 7, 1915.

Labor leaders have come to Bridgeport in such numbers and with such emphasis during the last month that the city is beginning to realize its prosperity, and fear it. Thousands of dollars have been turned into the coffers of organized labor as a result of the thorough-going work of organizers, who very apparently work on the theory that no factory is too small to have a strike.

It is a battle to make Bridgeport a closed town, and the Manufacturers' Association of the city is violently opposed to any such eventuation. It is true, however, that the association has remained all but supine in the face of this exacting situation, and thus far the labor leaders have had practically a clean sweep.

It has always been the boast of Bridgeport that it was an open shop city, where a man could earn his bread tranquilly without interference by outsiders. But within a few weeks all has changed, and employes of all branches of industry from corset makers to metal workers, have heeded the call of the organizers, and in some cases, the agitators, and they have flocked to the treasurers' desks with their admission fees and then sat back and began to wonder when they were going to work again.

The working population of the city is possessed of a definitely clear notion that there is a fatted calf loose in the pasture, and they are following the scent pointed out by the organizers to obtain a piece of the precious meat. Strikes on at 25 factories in a single week, and on a single day of the week, shows how the love of the chase has been fostered by those whose business it is to put grievances in the minds of labor.

It is a pathetic sight to see thousands flock to the banner of these leaders, only to admit their ignorance of why they are striking when the question is asked. Constant and insistent hammering by the organizers is all that keeps the men cognizant of the fact that they are on strike.

Aside from the strike situation, business is as good as ever. All the metal factories of the city have all the business they can handle, and that is why the labor movement has struck such a mother lode of success. Factories which could afford to shut down and hold out, such as the Bryant Electric Company, the Star Shirt Company and the Salt's Textile Company, have done so, but not so with the metal factories, who have given into the demands of the strikers practically without exception.

The machinists' situation was settled sensibly and amicably. The Locomobile Company and the British Company, two of the biggest manufacturing plants in the State, have granted the eight-hour day and other concessions during the month, following the lead of the Remington Arms and Ammunition Company and the Remington Arms-Union Metallic Cartridge Company.

The statement that Bridgeport is now an eight-hour city can be made without qualification. That it will soon be a closed shop town now seems a certainty.

There is a prevailing opinion that is voiced by non-partisans, however, that within a comparatively short time, labor will feel a retaliating blow upon the part of capital. This is prophesied as soon as the flush of war business vanishes. To date the flush is at its height, and indications are that it will remain so for months to come.—E. C. D.

NEW BRITAIN, CONN.

SEPTEMBER 7, 1915.

The continued and ever growing demand for New Britain made articles is the keynote of conditions in the metal manufacturing field in this city today. All concerns engaged in making war supplies from shrapnel to cavalry equipment are rushed with orders and the other factories not included in that category are having enough orders to keep them busy. The outlook for the fall trade is very bright, according to the leading manufacturers here, particularly since they are not entirely dependent on the war orders. Should peace be declared tomorrow in Europe it would not seriously injure business here, and it might prove the opposite, for when the period of reconstruction comes abroad there will be a general demand for New Britain made hardware, including builders' hardware, carpenters' and mechanics' tools, and even house furnishings, such as tableware cutlery, etc. Thus it is easy to see that whatever the conditions abroad are New Britain manufacturers will continue to profit thereby.

Some weeks ago local newspapers carried much copy on the discovery of an alleged conspiracy to dynamite the North & Judd Manufacturing Company in this city by the Germans. This plant is working night and day turning out saddlery fittings for

the British army. The government officials are investigating the matter.

The New Britain Machine Company, according to Superintendent A. Buol, is not engaged in filling war orders. This is but a technical statement, however, as the factory is maintaining a night and day schedule, and the complicated machines being turned out are purchased by munition manufacturing concerns in various parts of the country and used almost exclusively in the manfacture of shrapnel.

What is the most important move in the history of the Skinner Chuck Company of New Britain, Conn., occurred on August 2, when a complete change of officers was made and the Hon. David N. Camp, New Britain's grand old man who is now in his ninety-fifth year, stepped out of the presidency of the concern, a position he has held since it was organized in 1888. Charles E. Glover, vice-president of the American Hardware Corporation, and general manager of the Corbin Screw Division, was chosen to succeed him. E. J. Skinner, formerly secretary and assistant treasurer, was elected vice-president and general manager in place of David O. Rogers and Paul K. Rogers was named as secretary and treasurer. The new officials are all capable men. President Glover is one of the city's leading manufacturers, and his name is known throughout the hardware world. Much of the credit for the position occupied today by the Corbin Screw Division is rightly given to him. Newly elected Vice-president Skinner is thoroughly familiar with his business, and is a son of one of the founders of the concern. As the name implies, the Skinner Chuck Company is chiefly engaged in the manufacture of lathe chucks. All kinds and sizes of chucks are made here, and the concern, which has enjoyed a steady growth since its infancy, has only recently erected a five-story addition to its plant.—H R. J.

PROVIDENCE, R. I.

SEPTEMBER 7, 1915.

Industrial interest has centered in the metal trades during the past few weeks and especially the last month, because of the numerous demands for higher wages and the talk of strikes at several of the plants. The manufacturers are keeping close watch on the doings of the labor leaders and in a number of instances extra and special watchmen and guards have been placed on duty.

All of the various plants are busy, many of them working until 9 or 10 o'clock at night in nearly all departments, while there are some, which, if they could secure enough skilled workers, would run double shifts, and only stop the plant from Saturday night until Monday morning. The demand for machinery of all kinds and for machine tools continues, and it is believed there are enough orders on hand at the different establishments at the present time to keep them going full time until July 1 of next year.

The jewelry industry is still very quiet, and it has been estimated that more than 50 per cent. of the workers in this line have found something else to do for the time being. There are a few of the firms that are securing some business and there appears to be a better feeling as to the future, and there are hopes that a decided improvement may be experienced by early September. Several of the plants are reported to be making export goods in brass and copper, but for whom nothing positive can be ascertained.

The increasing demands upon the American Emery Wheel Company have become so urgent that the concern has found it necessary to increase its factory facilities and the work of putting on an additional story is now being pushed. The section being raised is 45 by 90 feet of brick and mill construction and as soon as this is completed a second section is to be improved by raising the roof and putting in another story.

Extensive additions, alterations and general improvements are being made at the plant of the Metal Products Corporation and Machine Screw Corporation, corner of Thurber avenue and Blundell street. Contracts have been awarded for one addition that will be 212 feet in length and 60 in width, of one story, and the other 60 x 45 feet, two stories in height, with basement. The additions will be of brick, with concrete foundations and tar and gravel roof. The old offices will be renovated, a saw-tooth roof will be put on the storehouse and general alterations will be made.

H. J. Astle & Co., of this city, report an unusual run of business the past month. The concern has just installed a Boland pressure blower and piping system in the plant of the New England Glass Works, 12 Beverly street; a Boland polishing bench and dust collecting system in the factory of Dutee Wilcox & Co., 184 Washington street, and a Boland blower in the plant of the Ostby & Barton Company, Richmond street.

The R. Plews Manufacturing Company, Central Falls, making tin cylinders and metal goods, has been running a short time schedule for several weeks, but the indications are that the concern will start on a full-time schedule after Labor Day.

Considerable difficulty has been experienced during the past month by machine tool manufacturers because of the activities of labor agitators in endeavoring to force the eight-hour day and an increase in wages. Woonsocket has been especially harassed and determined efforts have been made to secure a footing for the union at the Brown & Sharpe plant, but it is understood that little or no progress has been made.

The Hope Foundry, this city, according to statements from officers in that company, is doing such a large business at the present time that it is confronted with a shortage of labor. For several weeks past the concern has been working to its capacity with every indication that the rush will continue for a long time to come.

George W. Dover, who has started several concerns in manufacturing jewelers' findings and other metal products, has just started in business at 80 Clifford street as the George W. Dover Parts Company. He has several large contracts for the manufacture of metal parts to be used in the assembling of munitions of war.

The Graham Manufacturing Company is running nearly to the full capacity in all of its departments and in some of them night shifts are being employed. This is especially true in regard to the bronze foundry, where orders are far ahead of the facilities of the plant. The company has recently completed a new one-story brick building just back of the bronze foundry that has been equipped with the latest automatic hydraulic stamping presses, which can be utilized for the regular work in silversmithing by the concern, although the present purpose is in connection with making heavy cup-shaped setting to be used in the manufacture of torpedoes. It is understood that several tons of these goods are being produced each week and that several thousands of dollars of orders are still ahead of the department.—W. H. M.

ATTLEBORO, MASS.

SEPTEMBER 7, 1915.

It is generally believed in this section that the jewelry business is about to experience a new lease of life and that the firms which, during the past year, have had hard work to keep their plants in operation will again be running to full capacity before the beginning of the new year. As an indication of these conditions it is noted that several of the largest firms in Attleboro and North Attleboro have reduced their annual vacation period from two weeks to one and that three factories in Attleboro have failed to close at all during the summer.

This apparent increase in business was unexpected at the time and there were few salesmen on the road, most of the orders being received by mail, showing that there was a real demand for jewelry and that it needed no artificial stimulant.

A jewelry popularization plan has been organized with Harvey E. Clap, of Attleboro, as its head. The plan is national in its scope and various methods are being used to bring it before the people. Articles showing what to wear and how are being published not only in the trade magazine, but in nearly every newspaper in the country. Good results are expected from this campaign.

War orders are not of much importance here, although it is reported that several firms are making steel parts for shells and other firms have been asked to figure on making them. The Mossberg Company, which is having its largest business year since its organization, owes much of the increase to war orders. They have been so successful that they have recently granted their employees a ten per cent. increase in wages. The increase was made voluntarily and without any request on the part of

the employees. There is also a current report that articles of jewelry are being made here and marked "Made in Germany," and they are then shipped to New York and from there sent to Germany, where they are marketed.—G. S. McK.

BOSTON, MASS.

SEPTEMBER 7, 1915.

Conditions have undergone no important change in a majority of the metal-working plants of the city.

H. E. Alsterlund & Co., manufacturing jewelers, now in the Washington building, are to have new quarters at 36 Bromfield street, taking a suite of three front rooms on the third floor, and securing about 2,000 feet of floor space.

The Standard Electric Time Company and Blodgett Clock Company have moved from 141 Franklin street to 45 Milk street, Room 513.

Building operations in the business section of the city have been conspicuously light this summer, so that the call for builders' hardware and interior fittings of various kinds has been more in evidence from the suburbs than from the usually busier central district.

Scarcely anything is heard relative to war contracts in Boston metal establishments. It was stated in press reports from the suburban city of Woburn, a short time ago, however, that two establishments there—the New England Manufacturing Company and the Smith & Wallace Company—are to fill European army contracts, the latter concern being superseded by the James E. Wallace Company, especially organized for the manufacture of a $2,000,000 order for rings for shrapnel.

The Fore River Shipbuilding Company, of Quincy, Mass., started work August 23 on a five-acre tract of land which is to be made into an athletic field for the workmen of the big plant. This is a sequel to the acquisition of the plant by the Bethlehem Steel Company, and the direct result of President Charles M. Schwab's interest in the establishment.—J. S. B.

BUFFALO, N. Y.

SEPTEMBER 7, 1915.

August trade was unusually good in this market. Nearly every non-ferrous plant was very active; and much optimism was expressed concerning the future. Some firms are refusing additional orders because they have all they can handle for the next six months to come. Fewer men are out of work. Competition continues to be keen, but this is attributed to the large number of out-of-town concerns who are competing for local trade. War orders continue to show a healthy growth.

Every foundry has increased its force and is working full time. A number of the foundrymen expect to take advantage of the drop in copper and some are hoping for tin to drop to 30 cents.

William Stewart, manager of the Unique Brass Foundry Company, who employs some 30 men, said: "I could easily use 60 men if I had the floor space."

The American Bronze Company, who have doubled their force, are doing some very difficult and heavy work for brewing companies.

The National Bronze Company has been awarded the contract to make a bronze tablet, 4 by 6 feet, for the new Buffalo water works.

The Schnell Bronze Bearing Company report that June, July and August have been the best months in their entire history.

Zero Valve and Brass Manufacturing Company has been awarded the contract to make a 2 x 4-foot verde-antique finish bronze tablets and 26 sign plates 3 x 18 inches of the same finish with such lettering as "Encyclopedias," "Literature," etc., all of which are to be used at the South Buffalo High School.

The volume of business which is foreign and domestic among the electroplaters is about even. Everywhere things are moving very brisk.

A. F. Flanders Manufacturing Company are as busy as ever, and particularly with specialties.

W. E. Pleadwell, the electro-metallurgical chemist for the A. G. Fries Plating Company, reports that they have enough work to keep them busy for some months to come.

Washington Plating Works have just booked an order to plate 1,500,000 parts which go with aeroplane motors. The finish will be dull nickel. They have installed another 8 x 5 x 4-foot nickel tank. A motor truck has been added to their shipping department. They have also received a large number of inquiries for foreign countries about their combination pliers.

The finishing, stamping and rolling mills continue to show much activity.

Edward P. Sharp, who owns the patent rights for the Ideal trolley wheel and who has been in charge of the trolley wheel department at the Lumen Bearing Company for the past fifteen years, has bought the equipment and tools from the Lumen Bearing Company used in the manufacture of trolley wheels and started in business for himself at 56-58 Indiana street.—G. W. G.

NIAGARA FALLS, N. Y.

SEPTEMBER 7, 1915.

Trade in this market continues to have a very healthy tone. Much activity seems to exist and competition is keen. A scarcity of day laborers prevails here. Laborers in large numbers have returned to take up arms in the European war.

The Titanium Alloy Manufacturing Company's foundry has never been so busy as during the past month. The 16-inch titanium aluminum bronze worm gear which was recently made by this concern for a large company's charging machine has stood a remarkable test. The buyer of this steel mill writes that the average life of a steel worm gear had been four weeks and the record life eight weeks, also that the recently installed titanium aluminum bronze gear has been in operation for ten weeks and shows little signs of wear.

The Frontier Brass Foundry has just been awarded a contract from the British Government to supply 500,000 aluminum drinking cups. By enlarging their plant and working force they expect to put out 1,000 cups a day.

T. B. Allen, who was formerly the metallurgical engineer for the Carborundum Company, has just organized a company which will be known as the General Abrasives Company. Ground has been broken for the foundations.

The electroplating, stamping, jewelry and silverware trades continue to be brisk and particularly the jewelry business. The late vacationers are now swarming to the falls and this helps the local jewelry manufacturing and retail trade very much.

The Carborundum Company have been very busy this month. Their summer camp for the Order of Eeh-Nis-Kim, an order which was organized by this company to create better feeling between the hardware dealers and themselves, has been very successful. The company pays all the expenses of maintaining the camp except for foods. These are served to the campers at cost. Some of the campers have come all the way from Australia and New Zealand.—G. W. G.

COLUMBUS, OHIO

SEPTEMBER 7, 1915.

The metal business in Columbus and central Ohio has been fairly active during the past month. Starting off August 1, there was a marked increase which gradually gave way to more quiet conditions. But on the whole the trade has been as satisfactory as could be expected when the business depression is considered. The tone towards the close was stronger and there was a tendency for prices to go to higher levels. Prospects for the future are generally considered good.

Most of the Columbus people who handle metals report a larger volume of business than was shown by the records of last year. Shipments are pretty large and have been gradually increasing. Concerns using metals have been gradually increasing their requisitions, indicating a more healthy condition in the metal industry.

Brass is slightly weaker in the Columbus market, although prices are generally unchanged. Red brass is selling at from 12½ to 12¾ cents, while No. 1 yellow brass is quoted at 11½ to 12 cents. Copper is holding up firmly all along the line and crucible shape is quoted at 15½ to 16 cents. Aluminum is firm and the price is about 28 cents per pound. Babbitt metal is unchanged from the previous month. Tin is weaker and the same is true of zinc.

Henry Loeb, president and manager of the Ohio Metal Company, 1131-1137 North Fourth street, announces the erection of a large addition to his plant and the construction of a rever-

beratory furnace. This is to be used in the electrotyping and stereotyping trades. The factory of the Solar Metal Products Company, of Columbus, has been completed and the machinery is installed. Vice-President Henry R. Gogay is in charge of the plant. The plant occupies a six-acre tract at Third and Cleveland avenues.

It is announced that the American Stamping and Enameling Company will enlarge its enameling department at the Novelty plant in Bellaire, Ohio, just as soon as the pressing department is transferred to the factory at Massillon. The work of removing the contents of the pressing department is going on this week and will be completed within a short time. When this work is completed the company will begin at once to increase the enameling department, and the loss of the pressing department to this city will be more than offset by the enlargement of the enameling department.—J. N. L.

DETROIT, MICH.

SEPTEMBER 7, 1915.

Business conditions in the brass, copper and aluminum trade in Detroit and vicinity continue vigorous in every line, with the possible exception of plumbers' supply manufacturing concerns, which at this season are usually quiet. Manufacturers who are engaged in other lines of work, such as the manufacture of automobile parts and accessories, are kept busy with contracts not in their regular line. Added to these are a number of heavy contracts for war supplies which, as near as can be learned from inquiry, are being filled by many manufacturers throughout the city and its suburbs. But the greatest boon to the metal industry here is the demand for automobile parts from the big factories, such as the Packard, Cadillac, Studebaker, Maxwell, Page, Hupp, Federal Truck Company, Ford, Lozier and a great number of other smaller concerns which not only produce complete cars, but also manufacture all kinds of parts.

The Packard is starting on a new addition that will enable it to employ from 5,000 to 10,000 men. It is understood in this new building will be established a great brass foundry. It also is understood that the Cadillac Motor Company is planning for extensive additions, and one report is that the officers are planning the erection of an entirely new plant, as it has been known for some time the Cadillac company is pressed for room, owing to the great increase in business.

Henry Ford also is still engaged in preparations for the erection of a great tractor plant, which when completed, he says, will employ about 20,000 men. These concerns use enormous quantities of brass and all have foundries of their own, but notwithstanding this they, they are unable to produce enough for their requirements so are forced to rely on the smaller brass plants throughout the city. It is due to this situation that makes business so vigorous here when other cities report conditions quiet.

The past ten months have been extremely prosperous in the Detroit brass and aluminum field and the future has prospects of continued success. So long as the automobile industry remains vigorous, the brass and aluminum business will keep up to its present high tide.

From inquiry among the automobile manufacturers it is learned they have orders booked ahead that will keep them busy until well along toward spring. Taking everything into consideration, the outlook for the metal industry at this time is extremely favorable.—F. J. H.

In past years the automobile manufacturers have closed their plants two weeks during the months of July or August, but owing to the demand for their product one week was the limit and some of them have kept right along manufacturing without a stop.

Manufacturers of jewelry and optical goods have made rapid strides in Detroit within the last few years. Today there are a number of well equipped factories making various lines of jewelry and optical goods. Placed alongside the articles made elsewhere, the Detroit product compares favorably and proof of this is found in the extensive outside business which some of the companies now enjoy. The growth of the business has necessitated a number of enlargements in buildings and the trade is giving employment to hundreds of skilled workmen in jewelry and optical trades, a large part of the manufacturing and assembling being done here.

The manufacturers of plumbing and steam brass specialties are doing a fair business in their line, but owing to the decrease in building operations throughout the country they are feeling the effects of same. The majority of these plants make some brass automobile parts and they utilize their machines for producing this line.

The Master Carburetor Manufacturing Company are now located in their new plant on West Fort street.

The Capital Brass Manufacturing Company, located at Franklin and Chene streets, are running to their full capacity.

The General Aluminum and Brass Manufacturing Company, located at Boulevard and St. Aubin avenue, are increasing their production every week to keep up with their large growing business.—P. W. B.

CINCINNATI, OHIO

SEPTEMBER 7, 1915.

The increasing indications of a return to normal business conditions in many, if not all, industries, which are in evidence with the approach of the fall season, furnish the best possible reason for the cheerfulness which is seen in the metal trades in this vicinity. With a large proportion of the trade, at least those dependent on the machine-tool business, running anywhere from full time to three shifts as the result of a flood of war orders, there has probably been more money disbursed this summer than for a good many years in Cincinnati; and with a resumption of the demand from other sources, not dependent upon war orders, it seems fairly certain that all departments of the trade will be kept busy at a rate almost unprecedented. Even now it may safely be said that there is plenty of business on hand with many concerns having no connection whatever with the war in any form, the Lunkenheimer Company, the great manufacturer of valves and other specialties, being a conspicuous example of this. One of the officers of the company recently denied specifically certain reports that it was busy on the manufacture of shells and other goods for the warring nations, stating that the company is handling none of this business. It made a bid on some shells some time ago, but did not get the order at its figure, and has gone after none of this nature since. At the same time the company is able to report a good demand for its various products from the usual peaceful industrial sources and prospects for continued and improving demand.

Thomas Ford, president of the Bourbon Copper and Brass Works, at 618-20 Front street, recently celebrated the fiftieth anniversary in business there with a dinner staged in a Pearl street establishment, on Mr. Ford's own insistence that the affair be a real "bottoms dinner." The significance of this lies in the fact that many business houses have moved out of the lower part of the city, especially during the past few years, on account of the more or less regular occurrence of floods of the Ohio; Mr. Ford, however, has stuck to his post. He has been with the company for his entire business career, starting at the age of 19 as an employee, and later becoming in turn part owner and president.

The Icy-Hot Bottle Company, of Cincinnati, which manufactures a line of vacuum bottles and similar specialties, recently made one of the largest single purchases of aluminum goods ever handled in this part of the country, E. A. Coursey disposing of about $75,000 worth to the company. It is understood that the material is to be made up almost entirely into goods for shipment to Europe for the use of the belligerents.—K. C. C.

SAN FRANCISCO, CAL.

SEPTEMBER 7, 1915.

Business conditions in the neighborhood of San Francisco continue to show improvement in some respects. Prices on brass and copper scrap which have been ranging far above normal due to the enormous demand in the East showed a sharp decline about the middle of the month, red brass declining to 12 cents and copper to 15½ cents. Yellow brass has remained around 11½ cents for the month. Zinc took a sudden drop to around 7 and 8 cents. Sheet and copper tubing continue in strong demand with prices ranging around 28 cents on sheet and 36 to 50

cents on tubing. Prices on babbitt material which showed a sharp advance in June have since remained stationary. The high prices prevailing on galvanizing material have caused a stagnation in this line of work.

Rumors have been going the rounds that representatives of eastern munitions manufacturers have been in the city looking over available factory machinery to put in motion to help out the demand for munitions abroad.

The California Foundrymen's Association which has been largely made up from the iron and steel industries is endeavoring to organize a section devoted to the brass founders of the vicinity. Prospects are good for the success of the plan. The brass founders of San Francisco have needed something of the kind for a long time, this being especially true in the matter of credits and collections.

L. Wagner & Sons, 85 Minna street, coppersmiths, report conditions in sale of copper sheets and tubing as being excellent as well as general copper smithing. The company is filling several large contracts which are keeping a considerable force busy.

The Golden Gate Brass Manufacturing Company, 48 Tehama street, has secured the contract for building a new type of electric water heater which is being put on the market. The contract will total more than $10,000.

The Oscar Krenz Copper & Brass Works, 431 Folsom street, has just completed a $15,000 evaporator contract for the California Wine Association. Various wines and brewery installations are under way, including the copper installation for the new Rainier Brewing Company's plant.

The Western Brass Manufacturing Company, 217 Tehama street, report business as being better than for a long time previous. Builders' hardware is the main line handled by the firm.

The Kingwell Brass Works, 444 Natoma street, report conditions as showing a decided improvement during the past month. The firm manufactures for the jobbers' trade and has one of the most up-to-date plants in the bay district. Collections are reported as being good, most accounts being discounted.

The Keystone Ornamental Iron & Bronze Company, 300 Natoma street, report conditions as improving. The firm has just completed the work of hanging the ornamental bronze doors for the new French church in San Francisco.—A. A. W.

TRENTON, N. J.

SEPTEMBER 7, 1915.

Trenton manufacturers are somewhat concerned over the agitation to inaugurate a state-wide strike among machinists for the purpose of creating an eight-hour day for the same wage now being paid. This concession has been granted by some concerns in the northern part of the state, but the Trenton manufacturers have not yet agreed to the demand. Machinists in this section are not well paid and they are taking advantage of the busy season to present their demands. Several of the local plants are busy making war munitions, and it is not likely that the firms will allow their plants to become tied up when war orders have to be filled in a certain time. An effort will also be made, it is said, to organize the employees of the Jordan L. Mott Company and ask for an increase in wages. Should a general strike of machinists be called every metal plant in this city would be effected. An effort was made some time ago to organize all the brass workers of the Mott company. The company threatened to discharge all employees who became affiliated with the union, and many refused to join. The brassworkers have an organization here, but many working at the craft are not affiliated with it.

Compared with other business conditions, the metal industry has shown a marked improvement during the past month. A boom in building operations always helps the metal industry and increases the output. The Skillman Hardware Manufacturing Company finds a big demand for brass locks and other necessities for the building line. Because of the fact that the police in the larger cities find that many robberies are due to the fact that row after row of houses have the same kind of a lock contractors will in the future have different locks made.

Aside from working on war orders the Mott company is busy in the brass department and the outlook for the fall is very encouraging. Two hundred employees of the Roebling company at Roebling, N. J., near here, went on strike because of a cut in wages. When the company announced that none of the strikers would be taken back, 500 more employees, who had also threatened to walk out, remained loyal to the company. The strikers have been notified that they must now vacate their homes, which are owned by the Roebling company.—C. A. L.

NEWARK, N. J.

SEPTEMBER 7, 1915.

Business is undoubtedly considerably better fundamentally than it was a month or two ago. On the surface the improvement that has been made shows but little perhaps, things still appearing very quiet. A certain amount of slackness is usually expected during the vacation months, however, so only a part of the present dullness is due to business depression. Just how much is a little problematical, but on the whole things are not up to normal. That things are picking up is evident to anyone who looks into conditions thoroughly, and the indications are that when business men generally return from their vacations and begin to put into execution the plans which they have been forming the past few weeks, there will be a noticeable improvement in the business situation. Few, if any, look for anything like boom times, but hundreds of manufacturers, merchants, bankers, etc., are looking for better business the coming fall than we have had for some time, barring some decided setback from some unforeseen cause. There is a considerable sprinkling of those who look at the situation pessimistically and say that conditions will not be improved until after the European war is over, or until there is a new administration, but there is, on the other hand, a growing feeling on the part of many that good times are ahead of us, and that they will come regardless of whether the war goes on or not and whether there is a change of administration or not. The banks are full of money, the water has been pressed out of securities of various kinds, forced economies have taught manufacturers prudence and given them a healthy cautiousness that will work for safer business, the stocks of retail merchants are as a general thing low, so that with the first real call for goods there will be an immediate demand for stock from the manufacturers and things generally have been getting down to rock bottom.

The Hagerstrom & Chapman Company, manufacturing jewelers at 85 Columbia street, have worked up an entirely new line of 15 kt. gold jewelry, and the members of the firm hope, by the campaign which they will wage for the introduction of this line of goods, to make 18 kt. instead of 14 kt. the standard for gold jewelry in this country. Maurice Hagerstrom, of the company, in talking with a representative of The Metal Industry, stated that their new line was especially appropriate this year, and this is a green gold year and it is only possible to get the true, old English green gold in 18 kt. He stated that where an attempt is made to give 14 kt. gold a green appearance other ingredients have to be worked into the metal which injure its quality.

A brass foundry is being erected by the Waclark Wire Works, of Elizabeth, N. J. It is of brick and one story high. It will be entirely fireproof and will cost $16,000. The smokestack will be 150 feet high and will be five feet in diameter.

Business is very good and picking up all the time, is the report given at the office of the Aluminum Plated Ware Company, 397 Market street. Collections, however, are reported very slow. The outlook for fall is considered very good and the firm is planning to double its output. The company does gold, silver and bronze plating on pure aluminum. It had an exhibit of its goods at the convention just held in New York City by the National Retail Jewelers' Association.

Four out of five of the factory buildings of the new plant of the Midvale Chemical Company, which is being erected at Elizabeth, N. J., are nearly completed. The company now plans to erect an office building at a cost of $1,500.

The Lafayette Manufacturing Company, manufacturers of metal manicure and toilet goods at Lafayette and Liberty streets, report that business is very good at the present time. They are working full time and almost to capacity. Plans have been made for a galvanized iron shed in connection with the factory, which, when completed, will be used for the storage of boxes, which will give more floor and bench space in the factory proper.

J. Wiss & Sons, manufacturers of cutlery at 31 Littleton avenue, will soon erect a four-story addition measuring 50 x 75 feet to their present factory. It will be built of brick and will cost $15,000.—R. B. M.

LOUISVILLE, KY.

SEPTEMBER 7, 1915.

General conditions in Louisville have assumed a far better aspect during the past month, and the tension has been relieved somewhat. The coppersmiths and brass workers are not what might be termed busy, but more work is coming in and it looks as if fall business will be about up to normal.

Prices quoted on copper in Louisville have been slightly lower this month than they were last. The local trade reports that no trouble is being experienced in obtaining copper sheet material, but that for brass and copper tubing orders have to be placed six to seven weeks ahead of delivery. Emergency cases have been noted where shipments have been received in fairly good time, but as a rule the manufacturers have been unable to make quick shipments on orders.

It is probable that a change will be made shortly in the management of the American Brass & Plating Works. T. J. Hines, of Hines & Ritchey, is president of the company, while J. A. McGill is secretary-treasurer. Hines & Ritchey own about three-fourths of the capital stock of the plating concern, but are on the verge of selling their interests in order to give their entire time and attention to the Hines & Ritchey concern. In the event of the change taking place Hines & Ritchey will be out of the casting business and will have all of this work done outside of their plant. It is understood that Mr. McGill and other local men will continue the plant as soon as the change is effected.

J. W. Rademaker, manager of the Independent Brass Works, reports that things are generally quiet just now, but that the outlook for fall business is excellent. The concern has been making a number of fine castings lately of silver bronze for use in milk machinery.

At Kokomo, Ind., W. J. Johnson, general manager of the Kokomo Brass Works, has announced that two large additions would be added to the factory building and the capacity would be doubled. Both of the new buildings will be three stories in height. The company is now employing 610 men, who are working on day and night shifts. When the plant is completed the company proposes to operate with 1,000 men on day and night shifts. The concern manufactures automobile parts.

N. A. Klein and Charles Anger, of Madison, Ind., have just completed erection and equipping of a new iron and brass foundry which will operate under the firm name of Klein & Anger. Fires were started on August 14. The plant is equipped with two cupolas for brass casting and two for iron. One of the brass posts is for small castings of five to ten pounds, while the other is large enough to handle almost any kind of work. A core oven and forge are operated in connection with the plant. Mr. Klein is one of the oldest molders in the city, and learned his trade with the old Cobb & Stribling Foundry during the period from 1866 to 1870. The concern will specialize on rush orders.

Two Louisville concerns which were reported last month as dickering for some war orders for shells, etc., for the Allies have turned down the business and so far as is known there is no brass or copper work being done in Louisville on war supplies.

The Aluminum Company of America, with offices at Pittsburgh and New York, is reported to be planning the construction of a new plant at Maryville, Tenn., to develop water power and to extend its aluminum operations.—G. D. C.

NEWS OF THE METAL INDUSTRY GATHERED FROM SCATTERED SOURCES

The Baird Machine Company, Bridgeport, Conn., manufacturer of automatic wire and sheet-metal working machinery, recently completed a storehouse, 50 x 150 feet.

The Pilling Brass Company, 480 Watertown avenue, Waterbury, Conn., has awarded the contract for the construction of a one-story, 50 x 70 feet, addition to its plant.

The Metal Products Corporation, Providence, R. I., has awarded the contract for the construction of a one-story, 60 x 212 feet, and a two-story, 45 x 60 feet, brick addition to its plant.

W. S. Burgess has disposed of his interest in the Stoddard-Burgess Company, brass and aluminum founders, 426 South Clinton street, Chicago, Ill., to E. B. Stoddard, who will continue the business.

The Kathodian Bronze Works, New York, N. Y., have reorganized under the laws of the State of Delaware, and will be operated under practically the same name, they having acquired all the assets and business of the New York corporation.

The Detroit Metal Refining Company, Detroit, Mich., has been organized and started in business at 460 Lawton avenue, Detroit, Mich., and is under the management of Sol Sadeh, who was formerly connected with the Progressive Metal & Refining Company, Milwaukee, Wis.

The American Metal Company, 61 Broadway, New York, N. Y., report that as the largest interests of the Southern Aluminum Company, at Whitney, N. C., are French capitalists who are not able to furnish necessary funds during the war, work on the plant has been discontinued until the end of the war.

In compliance with the order of the Superior Court the property and good will of the Newburyport Silver Company, Keene, N. H., was sold at auction on August 20 at the company's factory for $13,150. It was bid off for that sum by J. J. Nichols, of the H. O. Rogers Silver Company, of Taunton, Mass.

R. Bilz, formerly superintendent of the brass and bronze foundry of the John Williams Bronze Foundry, New York, is now manager of the New Jersey Monumental Foundry, 683 Balk street, West New York, New Jersey. This company produces high grade brass, bronze and silver castings of all kinds.

The A. J. Detloff Company, Detroit, Mich., manufacturer of automobile parts, is erecting a three-story addition to its plant. Brass and aluminum foundries are also being added. Besides the foundries this company operates plating, polishing, japanning, lacquering and machine shop departments.

The Gyro Metal Works, of Norfolk, Va., will go into its new quarters the latter part of November or early in December. The building will cost $15,000 and will be of fireproof construction and especially arranged for brass and iron foundry work, machining, automobile repairing and pattern making.

A new foundry, 90 x 120 feet, with 70 x 100 foot molding space, has been completed for the Engineering and Foundry Company, East and Flora streets, Stockton, Cal., and the first metal was poured on July 8. The company is capitalized at $100,000 and will do a general foundry business in brass, bronze and aluminum.

The Metals Coating Company of America, 122 South Michigan avenue, Chicago, Ill., exploiting the Schoop metals coating process, announces the opening of a New York City office at 30 Church street in charge of Edward McFarlan. The Boston office of the company is in charge of Herbert Jacques, Jr., and is located at 100 Summer street.

The Rome Brass and Copper Company, Rome, N. Y., has let the contract for the erection of an addition to its casting shop, 140 x 200 feet, one story. Among the departments operated by this concern are a smelting and refining department, brass, bronze and aluminum foundry, brass machine shop, rolling mill, tinning and brazing departments.

"The U. S. Reduction Company, manufacturer of aluminum alloys, babbitt metal, solder, etc., East Chicago, Ind., has just enlarged its plant by the completion of two buildings, one to be used for receiving purposes while the other, a two-story structure, as a laboratory equipped with most modern electric devices. The company will now be in a position to meet the increasing demands."

The Webster & Perks Tool Company, manufacturer of grinding and polishing machinery, Springfield, Ohio, on July 2 was consolidated with the Bauroth Machine & Tool Company, Toledo, Ohio. The equipment of the Bauroth company is being moved to Springfield and with the equipment of the Webster company and some new machinery recently purchased is being installed in new manufacturing quarters.

The published report that the New Jersey Zinc Company is preparing to add another department, a large rolling mill which will give employment to several hundred people, to its plat at Palmerton, Pa., is said, by the company, to be incorrect. The company, however, is constructing and equipping a small crushing and separating plant at Sterling Hill, N. J., and an addition to its separating plant at Franklin, N. J.

The Whiting Foundry Equipment Company, manufacturer of electric cranes and complete foundry equipment, Harvey, Ill., announce that they have arranged with the American Sand Blast and Machine Company, Chicago, Ill., for the manufacture of their complete sand blast line, including sand blast rooms, sand blast table machines, sand blast barrels, sand separators, etc. Full information and prices will be sent upon request by corresponding with the Whiting company.

The Webster & Perks Tool Company, Springfield, Ohio, and the Bauroth Machine & Tool Company, Toledo, Ohio, have been consolidated and the equipment of the latter factory has been moved to Springfield and installed in new manufacturing quarters. This adds considerably to the manufacturing capacity of the Webster and Perks Tool Company, who state that although the capacity of some of their departments is sold up for more than two years hence, they are in a position to consider future business in other departments.

The United Smelting and Aluminum Company, New Haven, Conn., advise that they are at the present time engaged in an extensive enlargement of their plant, adding a new three-story building and materially enlarging their floor space and storage warehouses. They are also installing the latest and most modern improvements for the production of pure aluminum ingots, alloys, shot or granulated aluminum, aluminum solder, etc., including ten new melting furnaces, which will give the company a capacity of over twenty thousand pounds per day. They invite correspondence with all concerns interested in the products mentioned, and advise their friends and customers that they will be in a better position than ever to take care of their wants in aluminum.

The Celluloid Zapon Company, manufacturer of varnishes, lacquers, etc., 200 Fifth avenue, New York, is making extensive additions to its Stamford factory. This includes a new power plant, a new distillation plant, a new laboratory and office building and a new building for making and shipping lacquers. The new lacquer building will be several hundred feet from their present lacquer mixing department and will be divided by fire walls into four compartments—two for lacquer mixing, one for color grinding and one for shipping. All construction will be of brick and concrete, no wood whatever being used. With two lacquer plants in Stamford and one in Chicago, this company will be better able than ever to give their trade quick and efficient service.

CHANGE IN NAME

The Watson Solar Window Company, manufacturers of metal partitions, etc., Chicago, Ill., has changed its name to the Solar Metal Products Company and has removed its plant to Columbus, Ohio.

LEGAL DECISION

The suit which was brought by Hess & Son, Philadelphia, Pa., against the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., for infringement of their Tinol solder patents, has been decided in the Lower Court as well as in the Appellate Court in favor of Hess & Son. These patents broadly cover solders which consist of pulverized metal together with a non-acid and non-corrosive flux, all combined ready for use.

REMOVALS

The Potter Studio, manufacturer of hand wrought jewelry and metal work, 10646 Euclid avenue, Cleveland, Ohio, has moved its studios to 4418 Euclid avenue.

The Unique Art Manufacturing Company, makers of jewelry novelties and metal goods, 180 Lafayette street, New York City, has removed its plant to 60 Shipman street, Newark, N. J.

ELECTION OF OFFICERS

At a recent meeting of the board of directors of the Nicholson File Company, attended by all the members, Harold C. Field was made a director of the corporation and certain new officers were elected, so that the officers are now as follows: President and general manager, Samuel M. Nicholson; vice-president and treasurer, Paul C. Nicholson; vice-president and assistant general manager, Walter W. Griffith; first assistant treasurer and cashier, Henry W. Herman; second assistant, treasurer, Albert J. Dana; secretary and assistant to president, Ernest S. Craig; assistant secretary and foreign sales manager, Harold C. Field; assistant secretary and manager of credit department, Augustus E. Saunders; domestic sales manager, Wallace L. Pond.

FIRES

Fire on August 5 gutted the plant of the Howard Demountable Rim Company, at Trenton, N. J. Little damage was done to the great amount of metal used in the plant. Treasurer William L. Howard is having the factory rebuilt.

The three-story brick building at 34 Mechanic street, the first floor of which is occupied by the silver plating firm of Morehouse, Dalton & Co., was swept by fire on August 27. The two upper floors of the building are vacant. The damage is approximately $2,500. When the firemen arrived it looked at first as if the fire might reach dangerous proportions and a second alarm was sent in. Buildings on either side of the burned structure were damaged by water and windows were broken and the frames scorched. In the factory were stored carboys of acids used in the process of silver plating and as the fire reached them they exploded with muffled reports. It is thought that the fire started in wooden boxes filled with floor sweepings.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence. Particulars of additional incorporations may frequently be found in the "Trade News" columns.

To do a general metal and smelting business.—The Detroit Metal Exchange, Detroit, Mich. Capital, $5,000. Incorporators: Joseph W. Allen, Edward E. Foster and Isadore Lewis.

To manufacture electrical appliances—Essex Electric Company, Newark, N. J. Capital, $125,000. Incorporators: Job H. Lippincott, Thomas S. Woodruff, William A. Smith, all of New York City.

To manufacture mechanical appliances—Henry Brady, Inc., Bloomfield, N. J. Capital, $30,000. Incorporators: Thomas A. Hill, Louis Enderle, Newark, N. J.; D. H. Douglas, Paterson, N. J.

To manufacture chandeliers, brackets, etc.—Hudson Chandelier Company, Town of Union, N. J. Capital, $25,000. Incorporators: Benjamin Zimmerman, West Hoboken, N. J.; J. J. Levin, Weehawken, N. J.; Abraham Boskowitz, Town of Union, N. J.

To manufacture machines and stamping work.—John's Machine and Stamping Works Company, Cleveland, Ohio. Capital, $100,000. Incorporators: Patrick C. Lavey, M. M. Feidner, Ben E. John and John J. Barth.

To manufacture copper rods.—The Electric Rod Mill, Rome, N. Y. Incorporators: Clarence R. Keeney, Frank M. Hotter, Jr., and Herbert T. Dyett. Ground will be broken in a few days for a mill 300 x 117 feet, which will be equipped with up-to-date rolling equipment.

To manufacture workmen's shoes with aluminum soles.—The Overland Shoe Company, Racine, Wis. Incorporators: Alvin, Max and Louis Wolff. The company is erecting a new plant, which will consist of two buildings, a main shop and office, 30 x 40 feet, two stories, and an aluminum foundry, one story, 28 x 40 feet. The company will also take in outside work on high-grade aluminum castings in connection with its regular line of products.

To manufacture foundry supplies.—The E. J. Woodison Company, Detroit, Mich., has incorporated in Canada to manufacture its regular line of foundry facings, supplies, platers' and polishers' materials, supplies and equipment, and also fire brick, fire brick shapes and fire clay. This company issues a catalog known as "Blast" every month which they will be glad to send to anyone interested in their products.

INQUIRIES AND OPPORTUNITIES

Under the directory of "Trade Wants" (published each month in the rear advertising pages), will be found a number of inquiries and opportunities which, if followed up, are a means of securing business. Our "Trade Want Directory" fills wants of all kinds, assists in the buying and selling of metals, machinery, foundry and platers' supplies, procures positions and secures capable assistants. See Want Ad. pages.

PRINTED MATTER

Metals.—The Taunton-New Bedford Copper Company, Taunton, Mass., have issued a new catalog giving complete description of their metal products, which include pure copper, yellow metal, naval bronze, manganese bronze sheets and rods, and extruded shapes.

Metal Products.—The Michigan Smelting & Refining Company, Detroit, Mich., describe their extensive line of metal products in a six page folder just issued. These products include ingot and bar metals, copper, brass, aluminum and tin, and various grades of bearing alloys, babbitts and solders.

Sand Blasts.—The Mott Sand Blast Manufacturing Company, 1157 East 138th street, New York, N. Y., announce through E. J. Rosenthal, manager, that they have for distribution four write-ups on different sand blast machines which they manufacture. Copies of any or all may be had upon request.

Testing Apparatus.—The Bausch & Lomb Optical Company, Rochetser, N. Y., have issued a catalog describing their line of optical instruments for the inspection and testing of materials. The products of the Bausch & Lomb Company, including microscopes for micrographic apparatus, centrifuges, glassware and other high grade optical products. Literature and information will be sent upon request.

Aqualene.—The Crescent Oil Company, New York, N. Y., have issued an interesting booklet devoted to the interests of aqualene. Aqualene is a water soluble oil used as a cooling agent with large proportions of water, and is also a lubricating medium for automatics, turret lathes, bolt cutters, grinding machines and other tools. Some very valuable data relating to the use of aqualene in various applications in the machining of metals are given in the booklet.

Bronze.—Hecla White Anti-Friction Bronze is described by Thomas Paulson & Son, Inc., Brooklyn, N. Y., in a little eighteen page booklet just issued by them. Hecla bronze is said to be, by the manufacturers, a bearing metal that fulfills all of the requirements of such a product, and they are now prepared to furnish castings of this material and of other alloys from customers' patterns or sketches. Hecla bronze may be obtained in long length round rods suitable for working in screw machines.

Testing Apparatus.—The metallographic laboratory of the Scientific Materials Company, Pittsburgh, Pa., have issued a bulletin describing the Scimatco line of apparatus for the physical testing of metals that they are engaged in manufacturing. The product of this company that is of particular interest to the metal trade is the Scimatco optical bench for use in the micrographical examination of metals. This instrument is described in a special catalog which may be had upon request.

FOREIGN TRADE OPPORTUNITIES

For addresses of these enquiries apply to Bureau of Foreign and Domestic Commerce, Washington, D. C., and give file numbers.

Tin, No. 16,400.—A business man in Italy informs an American consular officer that he desires to import large quantities of pure pig tin. It is stated that payment will be made against documents deposited in a foreign bank.

Zinc, No. 17,707.—An American consular officer in Italy reports that a business man in his district desires to secure an agency for the sale of first-fusion zinc in that country. References are given. Correspondence may be in English.

Aluminum Goods, No. 17,630.—A firm in Greece writes that it desires to be put in touch with American manufacturers and exporters of aluminum buttons and eyelets similar to samples, which may be examined at the Bureau or its branch offices.

Copper Wire and Sheets, No. 16,454.—A business man in Spain desires to communicate with American manufacturers and exporters of copper wire, ingots, and sheets for the manufacture of dynamos, motors, etc., and material for insulating the wire, etc.

Copper and Zinc, No. 16,419.—A firm in Switzerland informs an American consular officer that it desires to receive cable offers for 10 tons of copper and zinc in bars. A copy of the consul's report may be had on application to the bureau or its branch offices.

Bronze Wire, No. 16,405.—An American consular officer in France reports that a firm in his district, which manufactures press buttons for gloves, is in the market for phosphor bronze wire for making springs. It is stated that the firm is in a position to buy annually from 20 to 25 tons of this wire in the following sizes: 40/100, 45/100, 50/100, 55/100 and 60/100 of a millimeter. Prompt offers are desired.

Brass Sheets, No. 17,772.—A Portuguese importer informs an American consular officer that he is in the market for about 4,400 pounds of brass sheets of the following dimensions and quantities: Thickness, 2,200 pounds 25/100 mm., and 2,200 pounds 30/100 mm. Sizes of the sheets should be stated.

Correspondence may be in English. A sample of the brass may be examined at the Bureau of Foreign and Domestic Commerce or its branch offices.

Brass and Zinc Plates, Etc., No. 17,706.—A Portuguese firm writes an American consular officer that it is in the market for brass in plates and in rolls, nickeled zinc in plates, round steel wire for umbrellas, paragon steel wire for umbrellas, iron tubes polished and nickeled for umbrellas, copper wire, and hides and skins of all kinds. Prices should be made c. i. f. destination. Correspondence may be in English. References are given. It is stated that cash will be paid less discount after receipt and examination of the goods. Catalogs, price lists and full information should be sent at once.

CATALOG EXHIBIT

An exhibition of every kind of catalog may be seen at The Metal Industry office, 99 John street, New York. The Metal Industry is prepared to do all of the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding, for the entire job from beginning to end or any part of it.

METAL MARKET REVIEW

NEW YORK, September 7, 1915.

COPPER.

The price of copper declined during August from about 18¼ at the opening to 16 cents on August 24. The reason for the decline seems to have been an over-bought copper market in America. The London market was about in the same condition, only a little more so and electrolytic was freely offered in the London market at from 1 cent to about 1½ cents per pound below the New York market. There was nothing doing in either market. The large producers had, apparently, agreed to hold their copper for 18 cents. They were of course selling no copper, they had not sold a pound since the middle of June production was running at almost 130,000,000 pounds a month; stocks of unsold copper were accumulating and something had to be done to start a buying movement. The London market began to advance, in two days prices in London advanced about £6 per ton, the Wall street "news" tickers came out with the usual dope about large orders for export and home consumption, and the price of electrolytic was jumped from 16 to 18 cents before buyers had a chance to get any copper.

Basic conditions are exactly the same as two weeks ago, consumers were all well covered and there was plenty of copper then offering and there are today fully two months' production of copper still unsold.

The sudden advance of 2 cents per pound was simply a matter of manipulation. Had the advance been caused by steady buying each day by consumers, the movement would have been legitimate, but as it was all done in two days without any sales it looks very much like old time Wall street tactics with the American consumers as the goat.

The market today is quoted at 17½ cents for electrolytic, 17¾ cents for lake and 16¾ cents for casting.

TIN.

The tin market has been quite active during the month and prices sagged off for the first half of August and advanced later in the month to around 36 cents at the close. The consumption has been fairly good, and the statistics at the end of the month very favorable. Tin today is 33¾ cents.

LEAD.

With the free selling by outside interests the Trust has had to play second fiddle and prices have been reduced about ½ cent per pound. The market at the close is firmer and higher prices are likely to prevail. Lead is now 4.90.

SPELTER.

The spelter market, left to the legitimate demand of consumers, and the heavy stocks of metal resulted in a decline in price of about 6 cents per pound. With the price around 12 cents the producers of the metal suddenly turned buyers, and prices were easily run up again. Simply a matter of manipulation, and the three leading producers no doubt feel there are times when it is a national duty to support the spelter market, and this was one of the tricks. The funny part of it is that the United States is not the nation they are working for. The market today is made to look strong and is quoted at around 15¼ cents against about the same price a month, and a low of about 12 cents in the middle of the month.

ANTIMONY.

There is very little to be said about the antimony market. There is no English metal coming over and the price of Chinese and Japanese has declined about 5 cents to 28.50 to 29.50 cents per pound.

ALUMINUM.

The price of aluminum has advanced about 10 cents per pound. Ingots 98-99 per cent. pure are quoted today at $42.00.

SILVER.

The price of silver has fluctuated about 1 cent per ounce during the month, and closing around 46½ cents New York.

QUICKSILVER.

The quicksilver market has been dull and prices have declined about $3 per flask to $91 wholesale, and from $95 to $100 for jobbing lots.

PLATINUM.

The supply of platinum has not come along as usual and the market has been firmer. Prices are about $2 per ounce higher—at $44 for ordinary refined to $45 for 10 per cent. hard.

SHEET METALS.

It is interesting to note that the price of sheet copper has been reduced about 2 cents per pound from the highest, while ingot copper had declined about 4½ cents per pound, spelter went off about 6 cents, but brass products were held at pretty close to top notch figures. Copper wire followed the copper market and price today is 19 cents base on a copper market of 17¼ cents, whereas the brass and copper products are based on a 20½ copper market and about a 23 cent spelter market.

OLD METALS.

The old metal market follows absolutely the ups and downs of the London standard market. When standard goes up all are happy, when standard goes down nothing doing. The export demand is working up but prices are not attractive.—J. J. A.

AUGUST MOVEMENTS IN METALS

	Highest.	Lowest.	Closing.
COPPER,			
Lake	18.50	16.25	17.75
Electrolytic	18.25	15.75	17.50
Casing	17.25	15.50	16.75
TIN	35.50	33.25	33.75
LEAD	5.20	4.40	4.90
SPELTER	18.25	11.00	16.65
ANTIMONY (Chinese and Jap)	35.00	29.00	29.00
SILVER	48¼	46⅝	46⅝

WATERBURY AVERAGE

The average prices of Lake Copper and Brass Mill Spelter per pound as determined monthly at Waterbury, Conn.:

1913—Average for year, 15.83. 1914—Average for year, 13.91. 1915—January, 14⅛. February, 15.25. March, 15.75. April, 18.50. May, 22.50. June, 22.50. July, 22.25. August, 19.50.

Brass Mill Spelter. 1915—January, 6.55; February, 11.85; March, 12.15. April, 13.85. May, 20.55. June, 25.60. July, 24.90. August, 19.30.

Metal Prices, September 7, 1915

NEW METALS.

	Price per lb. Cents.
COPPER—DUTY FREE. PLATE, BAR, INGOT AND OLD COPPER.	
Manufactured 5 per centum.	
Lake, carload lots, nominal	17.75
Electrolytic, carload lots	17.50
Casting, carload lots	16.75
TIN—Duty Free.	
Straits of Malacca, carload lots	33.75
LEAD—Duty Pig, Bars and Old, 25%; pipe and sheets, 20%. Pig lead, carload lots	4.90
SPELTER—Duty 15%.	
Brass Special	15.25
Prime Western, carload lots, nominal	22.50
ALUMINUM—Duty Crude, 2c. per lb. Plates, sheets, bars and rods, 3½c. per lb.	
Small lots, f. o. b. factory	47.00
100 lb. lots, f. o. b. factory	45.00
Ton lots, f. o. b. factory	42.00
ANTIMONY—Duty free.	
Cookson's cask lots, nominal	....
Hallett's cask lots, nominal	....
Hungarian grade	28.50 to 29.00
NICKEL—Duty Ingot, 10%. Sheet, strip and wire 20% ad. valorem.	
Shot, Plaquettes, Ingots. Blocks according to quantity	48.00 to 50.00
ELECTROLYTIC—3 cents per pound extra.	
MANGANESE METAL	nominal
MAGNESIUM METAL—Duty 25% ad valorem (100 lb. lots)	6.00
BISMUTH—Duty free	nominal 3.00
CADMIUM—Duty free	nominal 1.90
CHROMIUM METAL—Duty free	.75
COBALT—97% pure	2.00
QUICKSILVER—Duty, 10% per flask of 75 pounds	92.50
	Price per oz.
GOLD—Duty free	$20.67
PLATINUM—Duty free	41.00
SILVER—Government assay—Duty free	46⅞

INGOT METALS.

	Price per lb. Cents.
Silicon Copper, 10% ..... according to quantity	29 to 31
Silicon Copper, 20% ..... " "	31 to 34
Silicon Copper, 30% guaranteed. " "	33 to 38
Phosphor Copper, guaranteed 15% " "	28 to 32
Phosphor Copper, guaranteed 10% " "	27 to 30
Manganese Copper, 30% ..... " "	27 to 30
Phosphor Tin, guaranteed 5% ... " "	58 to 61
Phosphor Tin, no guarantee ..... " "	46 to 49
Brass Ingot, Yellow ..... " "	12 to 14
Brass Ingot, Red ..... " "	14½ to 16
Bronze Ingot ..... " "	15½ to 16½
Manganese Bronze Ingots ..... " "	21 to 22½
Phosphor Bronze ..... " "	18 to 19½
Casting Aluminum Alloys ..... " "	16 to 18

PHOSPHORUS—Duty free.
According to quantity ..... 30 to 35

OLD METALS.

Dealers' Buying Prices. Cents per lb.		Dealers' Selling Prices. Cents per lb.
14.50 to 15.00	Heavy Cut Copper	16.00 to 16.50
14.00 to 14.50	Copper Wire	15.50 to 16.00
12.50 to 13.00	Light Copper	14.00 to 14.50
11.50 to 12.00	Heavy Mach. Comp	13.00 to 13.50
9.50 to 10.00	Heavy Brass	12.00 to 12.50
8.00 to 8.50	Light Brass	10.00 to 10.50
11.50 to 12.00	No. 1 Yellow Brass Turnings	13.50 to 14.00
10.00 to 10.50	No. 1 Comp. Turnings	11.50 to 12.00
4.00 to	Heavy Lead	.... to 4.50
10.00 to	Zinc Scrap	.... to 12.50
5.50 to 6.50	Scrap Aluminum Turnings	12.00 to 15.00
11.50 to 12.00	Scrap Aluminum, cast alloyed	20.00 to 24.00
13.00 to 14.00	Scrap Aluminum, sheet (new)	25.00 to 28.00
23.00 to 24.00	No. 1 Pewter	25.00 to 26.00
23.00 to 25.00	Old Nickel	23.00 to 25.00

PRICES OF SHEET COPPER.

BASE PRICE, 23.00 Cents per Lb. Net.

SIZE OF SHEETS. Width.	LENGTH.	64 oz. and over.	32 oz. to 64 oz.	24 oz. up to 32 oz.	16 oz. up to 24 oz.	15 oz.	14 oz.	13 oz.	12 oz.	11 oz.
		Extras in Cents per Pound for Sizes and Weights Other than Base.								
Not wider than 30 ins.	Not longer than 72 inches.	Base	Base	Base	Base	½	1	1½	2	2½
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	½	1	2	3	4½
	Longer than 96 inches. Not longer than 120 inches.	"	"	½	1	2	3	5	7	—
	Longer than 120 ins.	"	"	1	1½					
Wider than 30 ins., but not wider than 36 inches.	Not longer than 72 inches.	"	"	Base	Base	1	2	3	4	6
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	1	2	4	6	8
	Longer than 96 inches. Not longer than 120 inches.	"	"	1	2	3	4	—	—	—
	Longer than 120 inches.	"	1	2	3					
Wider than 36 ins., but not wider than 48 inches.	Not longer than 72 inches.	"	Base	1	2	3	4	6	8	9
	Longer than 72 inches. Not longer than 96 inches.	"	"	1	3	4	5	7	9	—
	Longer than 96 inches. Not longer than 120 inches.	"	"	2	4	6	9	—	—	—
	Longer than 120 inches.	"	1	3	6					
Wider than 48 ins., but not wider than 60 inches.	Not longer than 72 inches.	"	Base	1	3	5	7	9	11	—
	Longer than 72 inches. Not longer than 96 inches.	"	"	2	4	7	10	—	—	—
	Longer than 96 inches. Not longer than 120 inches.	"	1	3	6	—	—	—	—	—
	Longer than 120 inches.	1	2	4	8	—	—	—	—	—
Wider than 60 ins., but not wider than 72 ins.	Not longer than 96 inches.	Base	1	3	8	—	—	—	—	—
	Longer than 96 inches. Not longer than 120 inches.	"	2	5	10	—	—	—	—	—
	Longer than 120 inches.	1	3	8	—	—	—	—	—	—
Wider than 72 ins., but not wider than 108 ins.	Not longer than 96 inches.	1	3	6	—	—	—	—	—	—
	Longer than 96 inches. Not longer than 120 inches.	2	4	7	—	—	—	—	—	—
	Not longer than 120 inches.	3	5	9	—	—	—	—	—	—
Wider than 108 ins., but not wider than 120 ins.	Not longer than 120 inches.	4	6	—	—	—	—	—	—	—

The longest dimension in any sheet shall be considered as its length.

CIRCLES, 8 IN. DIAMETER AND LARGER, SEGMENTS AND PATTERN SHEETS, advance per pound over prices of Sheet Copper required to cut them from ..... 8c.

CIRCLES LESS THAN 8 IN. DIAMETER, advance per pound over prices of Sheet Copper required to cut them from ..... 5c.

COLD OR HARD ROLLED COPPER, 14 oz. per square foot and heavier, advance per pound over foregoing prices ..... 1c.

COLD OR HARD ROLLED COPPER, lighter than 14 oz. per square foot, advance per pound over foregoing prices ..... 2c.

COLD ROLLED ANNEALED COPPER, the same price as Cold Rolled Copper.

ALL POLISHED COPPER, 20 in. wide and under, advance per square foot over the price of Cold Rolled Copper ..... 1c.

ALL POLISHED COPPER, over 20 in. wide, advance per square foot over the price of Cold Rolled Copper ..... 2c.

For Polishing both sides, double the above price.

The Polishing extra for Circles and Segments to be charged on the full size of the sheet from which they are cut.

COLD ROLLED COPPER, prepared suitable for polishing, same prices and extras as Polished Copper.

ALL PLANISHED COPPER, advance per square foot over the prices for Polished Copper ..... 1c.

ZINC—Duty, sheet, 15%.

	Cents per lb.
Carload lots, standard sizes and gauges, at mill. ..18 cent basis, less	8%
Casks, jobbers' prices	20
Open casks, jobbers' prices	21

Metal Prices, September 7, 1915

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect July 2, 1915

To customers who buy over 5,000 lbs. per year.

	Net base per lb.		
	High Brass.	Low Brass.	Bronze.
Sheet	$0.26⅝	$0.26½	$0.26⅞
Wire	.26¾	.27	.27⅛
Rod	.26⅝	.27	.27⅛
Brazed tubing	.30¾	—	.33½
Open seam tubing	.30¾	—	.33½
Angles and channels	.30¾	—	.33½

To customers who buy 5,000 lbs. or less per year.

	Net base per lb.		
	High Brass.	Low Brass.	Bronze.
Sheet	$0.28½	$0.28½	$0.28⅝
Wire	.28½	.29	.29⅝
Rod	.28⅝	.29	.30
Brazed tubing	.32¼	—	.35½
Open seam tubing	.32¼	—	.35½
Angles and channels	.32¼	—	.35½

[Note.—Net extras for quality for both sections of above metal prices are not quoted due to the fluctuations in the price of zinc.—Ed.]

BARE COPPER WIRE—CARLOAD LOTS.

19c. per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order	24c.	per lb. base
100 lbs. to 300 lbs. in one order	24½c.	" " "
Less than 100 lbs. in one order	26c.	" " "

PRICES FOR SEAMLESS BRASS AND COPPER TUBING.

From 1¼ to 3½ O. D. Nos. 4 to 13 Stubs' Gauge, 32½c. per lb.
Seamless Copper Tubing, 30½c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron pipe sizes with price per pound.

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
40½	39½	34½	33½	32½	32½	32½	32½	32½	32½	32½	33½	34½	36½	38½	39½

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet—	
	Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1¼ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1⅞ inch	45	48
2 inch	56	60

Discount, 10%.

PRICE FOR TOBIN BRONZE AND MUNTZ METAL.

Tobin Bronze Red	34c.	net base
Munts or Yellow Metal Sheathing (14" x 48")	30½c.	" "
" " " " Rectangular sheets other than Sheathing	32c.	" "
" " " " Rod	30½c.	" "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bar in the rough, 38½c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturer.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Sheet Block Tin—18" wide or less. No. 26 B. & S. Gauge or thicker. 100 lbs. or more 5c. over Pig Tin. 50 to 100 lbs. 6c. over, 25 to 50 lbs. 8c. over, less than 25 lbs. 10c. over.

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more 4c. over Pig Tin. 50 to 100 lbs. 5c. over, 25 to 50 lbs. 7c. over, less 25 lbs. 9c. over.

Above prices f. o. b. mill.

Prices on wider or thinner metal on request.

PRICE SHEET FOR SHEET ALUMINUM—B. & S. Gauge.

Gauge.	Width. Inches.	1 ton.	50 to 2,000 lbs.	Less than 50 lbs.
20 and heavier	3-30	25.9	26c.	29c.
	3-30	26.9	27c.	30c.
21 to 24 inclusive	30-48	28.9	29c.	32c.
	48-60	31.9	32c.	35c.
25 to 26	3-30	27.9	28c.	31c.
	30-48	29.9	30c.	33c.
27	3-30	28.9	29c.	32c.
	30-48	31.9	32c.	35c.
28	3-30	29.9	30c.	33c.
	30-48	32.9	33c.	36c.
29	3-30	30.9	31c.	34c.
	30-48	34.9	35c.	38c.
30	3-30	31.9	32c.	35c.

The above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. No charge for boxing. F. O. B. Mill.

PRICE LIST SEAMLESS ALUMINUM TUBING.

STUBS' GAUGE THE STANDARD. SIZES CARRIED IN STOCK.
Outside Diameters. BASE PRICE, 22 Cents per Pound.

Stubs' Gauge.	Inches.	¼ in.	5-16 in.	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.	1¼ in.	1½ in.	1¾ in.	2 in.	2½ ins.	3 ins.	3½ ins.	4 ins.	4½ ins.
11.	.120.	..	..	..	..	..	..	..	26	23	..	..	13	11	9	8	15	22
12.	.109.	..	..	..	..	..	..	..	25	..	..	..	14	..	..	..	..	..
14.	.083.	..	..	..	..	..	..	..	..	..	..	..	16	..	..	..	..	..
16.	.065.	..	..	..	..	..	27	26	26	23	22	20	20	20	20	26	30	50
18.	.049.	..	..	..	..	32	29	28	27	24	25	25	25	..	..	..	..	..
20.	.035.	116	..	45	38	33	32	31	29	28	29	29	29	30	37	45	57	80
21.	.032.	..	..	..	39	..	..	..	..	..	..	..	..	..	..	..	..	..
22.	.028.	137	97	47	41	37	36	34	33	..	..	44	..	..	..	..	..	..
24.	.022.	187	132	107	87	78	72	61	59	65	..	..	..	..	..	..	..	..

Prices are for ten or more pounds at one time. For prices on sizes not carried in stock send for Manufacturers' List.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Price per lb. over 25 lbs., Diameter, B. & S. Gauge, No. 000 to 10 and 12, 26 cents. No. 12 to 20 inch, 28 cents.

BASE PRICE GRADE "B" GERMAN SILVER SHEET METAL.

Quality.	Net per lb.	Quality.	Net per lb.
5%	34c.	16%	38c.
8%	35½c.	18%	38½c.
10%	36c.	20%	41c.
12%	37c.	25%	49c.
15%	37½c.	30%	54c.

GERMAN SILVER WIRE.

Quality.	Net per lb.	Quality.	Net per lb.
5%	36c.	15%	42½c.
8%	38c.	16%	43¼c.
10%	39¼c.	18%	45¼c.
12%	41¼c.	30%	60½c.

The above Base Prices are subject to additions for extras as per lists printed in Brass Manufacturers' Price List and from such extras 50% discount will be allowed. The above base prices and discounts are named only to wholesale buyers who purchase in good quantities. Prices on small lots are considerably higher.

PRICES OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given, as prices range from 1c. below to 4c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2½c. to 3½c. above the price of bullion.